JUNE 15, 1960
Price 50c

TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

V.64 #12

DETROIT PUBLIC LI
JUN 17 1960
TECHNOLOGY DEPARTMENT
PICS
CHICAGO

NOT ACCORDING TO "SPEC," by L. A. Gritten

The Subscriber Carrier System, by John S. Reed

FUNDAMENTALS OF VNL, by C. D. Ehinger

Depreciation - Theory and Practice, by G. M. Jones

OUR THANKS TO
THE TELEPHONE INDUSTRY FOR

FIFTY BERRY YEARS

OF

**TELEPHONE DIRECTORY
ADVERTISING EXCLUSIVELY**

L. M. BERRY AND CO. • HULMAN BUILDING
DAYTON 2, OHIO • BALDWIN 4-7421

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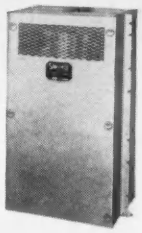
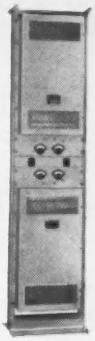
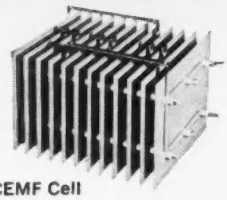


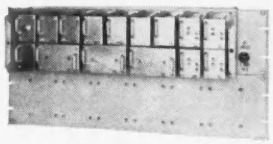
Decimonic Converter



Dual Flotrol



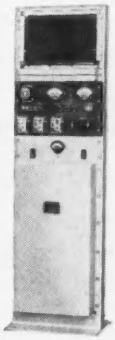
Dry CEMF Cell



Static Interrupter

Bat Tap d-c Voltage Reducer

PBX Power Supply



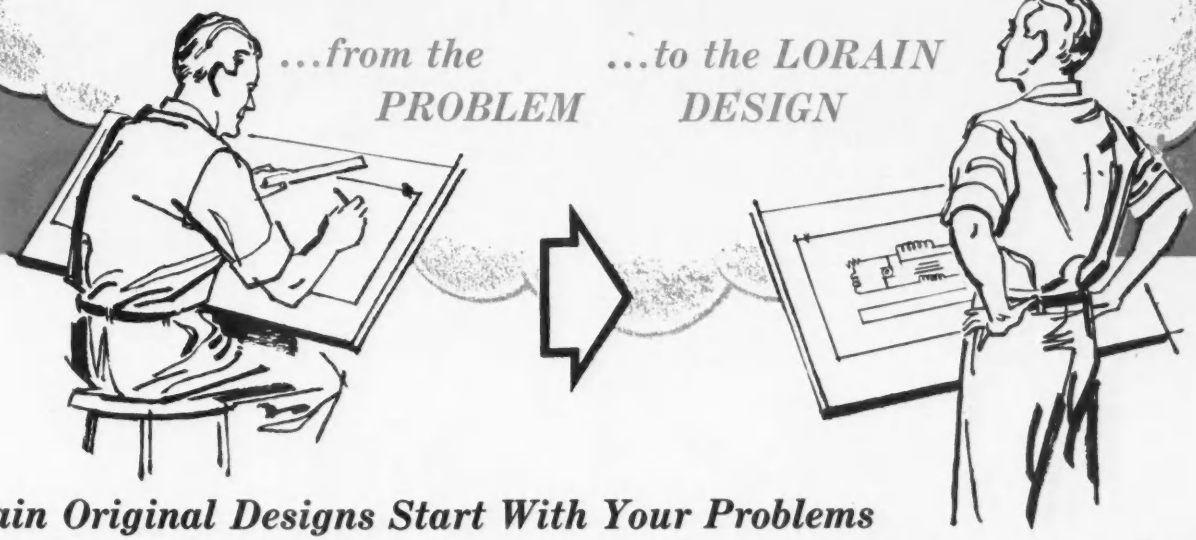
Power Panel

Transistorized
Multi-Frequency Converter

Howler

...from the PROBLEM

...to the LORAIN DESIGN



Lorain Original Designs Start With Your Problems

Throughout 24 years of unceasing attention to the problem of economic, efficient and uninterrupted operation of telephone systems, Lorain engineers have originated equipment which has become standard in the telephone industry.

Lorain contributions to the technical advance of the telephone industry include: Fully Static Ringing Converters (Sub-Cycle); Precision Regulated Automatic Battery Chargers (Flotrol); Static PBX Supply Units (T & RT); Dry CEMF Cells; Fully Static Tone Generators; Decimonic Ringing Converters; Transistorized Sine Wave Ringing Generators; Fully Static Interrupter Equipment; DC Autotransformers (Bat-Tap); The Frequency Modulated Howler; Battery Charging Rectifiers in the Kilowatt Range; Over and Under Charger Assemblies (Dual Flotrols).

Lorain Original Designs Solve Your Problems

LORAIN *Products Corporation* LORAIN, OHIO

LORAIN PRODUCTS (CANADA) LTD.—ST. THOMAS, ONTARIO

DESIGNERS AND MANUFACTURERS
SUB-CYCLE® CONVERTERS
FLOTROL® RECTIFIERS
PARTNERS IN DEPENDABILITY

Are you operating your company as a HOBBY OR A BUSINESS?

No business can endure without profit.

The key to profit is, of course, **increased** revenue! For the operating telephone company extension installations offer the prime opportunity to realize revenue increases!

The Ericofon is the biggest boost you can give yourself in your extension promotions! Subscribers want Ericofons—this has been proven over and over! **No other telephone** has the built-in appeal of the Ericofon, the built-in convenience of the Ericofon, the built-in beauty of the Ericofon, the built-in profit potential of the Ericofon.

North will help you in your extension promotions—North's Ericofon merchandising aid has already established a whole new pattern for the entire industry! The combination of Ericofons and Ericofon merchandising materials and plans—**available to you at no cost**—has worked successfully for countless companies already!

Are you losing revenue that could be yours? If you're not offering your subscribers Ericofons—you **are** losing revenue every day!

NOT SURE YET? YOU CAN GET PROOF FROM...

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY

NORTH ELECTRIC COMPANY

Galion, Ohio

NORTH

60-T-3

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TELEPHONE ENGINEER & MANAGEMENT

the telephone industry magazine

VOL. 64 NO. 12 JUNE 15, 1960

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The TE&M Front Cover

Group photo taken during recent Chicago meeting of USITA Advertising Committee shows Nathan E. Jacobs, Roy F. Smith, and R. C. Reno, all of Chicago; James F. McHenry, Jefferson City, Mo.; Paul H. Kaufman, Bellevue, Ohio; R. L. Post, Brownwood, Texas; Chairman C. C. Pearce, Riceville, Iowa; Homer Bennett (Telephone Advertising Institute); George P. Norton, New York City; L. D. Densmore, Lincoln, Neb.; Phil Rouda (TAI); and Leon Roberts, Washington, D. C. Also in attendance, but not present when the picture was taken, were Hugh A. Barnhart, Rochester, Ind.; and A. F. Monroe, New York City.

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POSTMASTER . . . Please send form 3579 to TELEPHONE ENGINEER & MANAGEMENT, 7720 N. Sheridan Rd., Chicago 26, Ill.

QUICK SERVICE

FROM WAREHOUSE STOCKS . . .

Copperweld®

LINE WIRE, STRAND, GROUND RODS, DROP WIRE, INSULATOR TIES

Legend

These National Telephone Distributors carry stocks of Copperweld Products at locations shown on map.

- (A) AUTOMATIC ELECTRIC
- (B) BUCKEYE TELEPHONE
- (G) GRAYBAR ELECTRIC
- (K) KELLOGG SWITCHBOARD
- (L) LEICH SALES
- (S) STROMBERG-CARLSON

And supplementing these stocks—

- (C) COPPERWELD WAREHOUSES

Call Your Copperweld Distributor for immediate delivery

Wherever you are, the fastest, most dependable way to get Copperweld Telephone Products—the best materials for your outside plant—is to contact the Copperweld Distributor in your area. He has large warehouse stocks on hand for immediate delivery and you'll find his service convenient. Important, too, is the cooperation you'll get from his people. They're all part of a team working for you.

Place your order now with your Copperweld Distributor. He's ready to show you real service.

COPPERWELD STEEL COMPANY

WIRE AND CABLE DIVISION *Glassport, Pa.*

For Export: COPPERWELD STEEL INTERNATIONAL COMPANY, New York

LINE WIRE

GUY AND MESSENGER STRAND

DROP WIRE

GRIP-FLEX INSULATOR TIES

GROUND RODS AND CLAMPS

Simplest GUY GUARD of all--to install CHANCE 808

HOOKS on TOP—BOLTS on BOTTOM

It's as simple as that to install. The top hook slips over the guy wire without the groundman stretching. A single bolt at the bottom fastens the guard to the guy rod, the guy wire or the guy loop. Guy guards that are easy to install are easy to get installed where and how you want them.

808 guards are available in 7 and 8 foot lengths in both galvanized steel and aluminum. Turned-in edges give added strength and safety.

Use these Aids to Pole Line Hardware Selection:

1. Chance T-48 Catalog.
2. Pole Line Hardware Cross Reference Guide.

CP59-13

A. B. CHANCE COMPANY
CENTRALIA, MISSOURI
A. B. Chance Co. of Canada, Ltd., Toronto

coming CONVENTIONS

NEW YORK Tel. Assoc., Scaroon Manor, Schroon Lake, N. Y., June 20-22.

ALASKA Tel. Assoc., Elk's Club, Sitka, Alaska, August 15-17.

TENNESSEE Tel. Assoc., Hermitage Hotel, Nashville, Tenn., Sept. 7-8.

ARKANSAS Tel. Assoc., Hermitage Hotel, Hot Springs, Ark., Sept. 12-13.

MICHIGAN Tel. Assoc., Grand Hotel, Mackinac Island, Mich., Sept. 12-13.

ROCKY MT. Tel. Assoc., Hilton Hotel, Denver, Colo., Sept. 14-16.

WEST VIRGINIA Tel. Assoc., Morgan Hotel, Morgantown, W. Va., Sept. 19-21.

NEVADA Tel. Assoc., Hotel Nevada, Ely, Nevada, Sept. 21, 22, 23.

NEW ENGLAND Tel. Assoc., Mt. Washington Hotel, Bretton Woods, N. H., Sept. 25-28.

NORTH CAROLINA Tel. Association, Carolina Hotel, Pinehurst, N. C., Oct. 3-4.

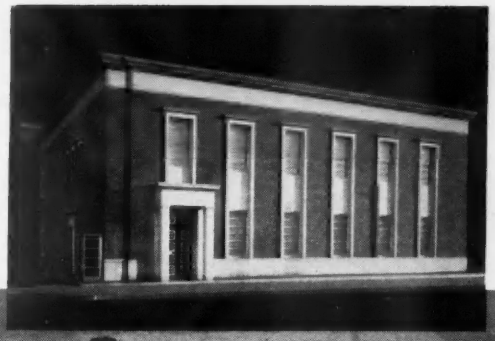
NATIONAL CONVENTION, Conrad Hilton Hotel, Chicago, Ill., Oct. 9-12.

SOUTH CAROLINA Tel. Association, Clemson House, Clemson, S. C., Oct. 24-25.

VIRGINIA Tel. Association, Roanoke Hotel, Roanoke, Va., Oct. 27-28.

GEORGIA Tel. Assoc., Biltmore Hotel, Atlanta Ga., Nov. 9-10.

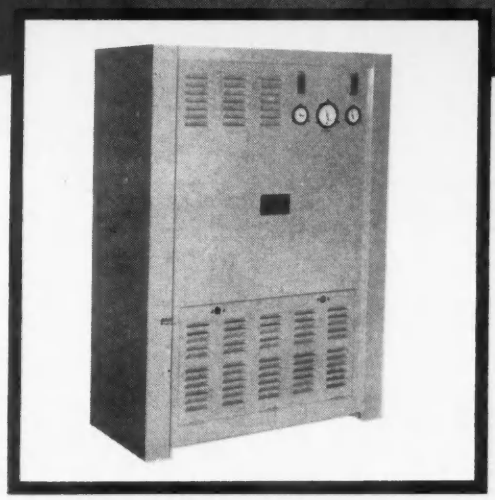
OKLAHOMA Tel. Assoc., Skirvin Hotel, Oklahoma City, Okla., Nov. 9-10.



PUREGAS AIR DRYERS

at work for the Virginia Telephone & Telegraph Company

Central Virginia Distirct Plant Superintendent C. E. Payne reviews their Puregas Installation



The Virginia Telephone & Telegraph Company, serving approximately 47,000 stations in Virginia, recently completed an installation of Puregas pressurizing equipment in their Charlottesville exchange.

Virginia Telephone & Telegraph thus has become another in the growing number of independent telephone companies across the nation that are capitalizing on continuous feed pressure systems to dramatically reduce moisture-caused service troubles.

To find out how a PUREGAS Pressurizing Program can just about eliminate emergencies caused by sheath breaks and moisture damage — check-off the bulletins you would like, and send this page to us with your name and address.

☐ *Data Sheets on Model 750, 1500 and 5000 Air Dryers*
☐ *"Why Cables Should be Pressurized"*
☐ *"Desert Dry Air . . . a Boom to the Telephone Industry"*
☐ *"Cost Comparison . . . Air Dryers vs. Nitrogen"*
☐ *"Meter Panel for Continuous Feed Pressure Systems"*

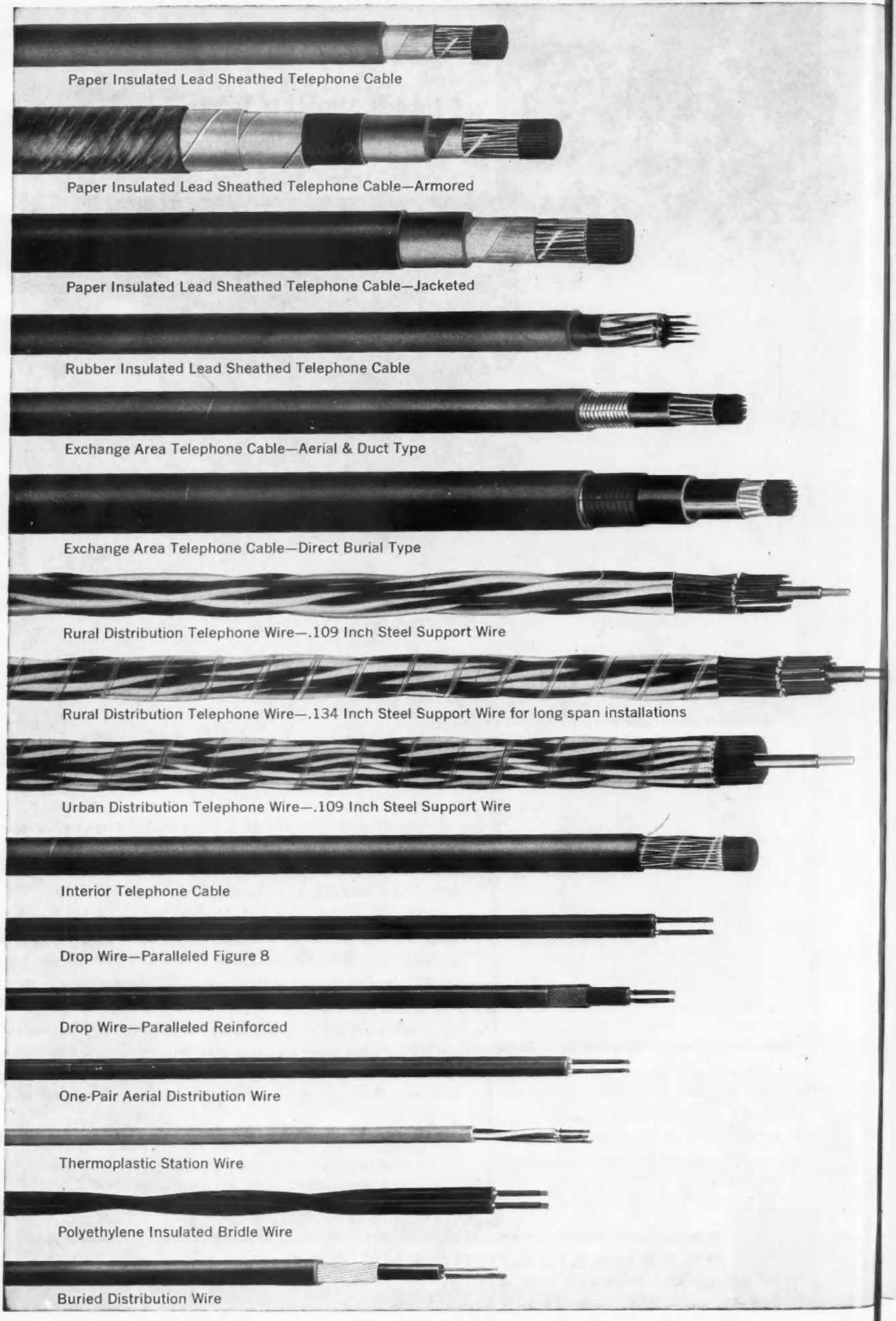
Here, in brief, are a few of the advantages offered by PUREGAS Cable Pressure Systems:

- **LOWER MAINTENANCE COSTS**
- **IMPROVED CUSTOMER SERVICE**
- **PROMPT NOTICE OF SHEATH BREAKS**
- **LONGER CABLE LIFE**

PEC

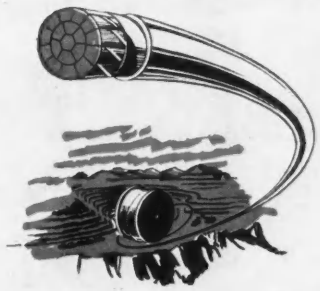
PUREGAS EQUIPMENT CORP.

578 OAK STREET, COPIAGUE, N. Y.


Paper Insulated Lead Sheathed Telephone Cable
Paper Insulated Lead Sheathed Telephone Cable—Armored
Paper Insulated Lead Sheathed Telephone Cable—Jacketed
Rubber Insulated Lead Sheathed Telephone Cable
Exchange Area Telephone Cable—Aerial & Duct Type
Exchange Area Telephone Cable—Direct Burial Type
Rural Distribution Telephone Wire—.109 Inch Steel Support Wire
Rural Distribution Telephone Wire—.134 Inch Steel Support Wire for long span installations
Urban Distribution Telephone Wire—.109 Inch Steel Support Wire
Interior Telephone Cable
Drop Wire—Paralleled Figure 8
Drop Wire—Paralleled Reinforced
One-Pair Aerial Distribution Wire
Thermoplastic Station Wire
Polyethylene Insulated Bridle Wire
Buried Distribution Wire

FOR PRODUCT DEPENDABILITY . . . SPECIFY

PHELPS DODGE
TELEPHONE WIRE & CABLE



. . . the "mine-to-market" quality line!

Behind the rugged dependability and high quality of Phelps Dodge telephone wire and cable are years of experience and research in the design and manufacture of communication cables.

Phelps Dodge pioneered the use of lead, paper, rubber and thermoplastics as applied to wire and cable. This valuable background of knowledge is combined by Phelps Dodge with highest grade materials and controlled craftsmanship in fabrication. The result is a complete line of reliable telephone wire and cable that helps reduce maintenance costs and provide longer in-life service.

Phelps Dodge will be glad to help you fill your wire and cable requirements. Get in touch with your nearest Phelps Dodge sales office.

PHELPS DODGE COPPER PRODUCTS CORPORATION

SALES OFFICES: Atlanta, Birmingham, Ala., Cambridge, Mass., Charlotte, Chicago, Cincinnati, Cleveland, Dallas, Dayton, Denver, Detroit, Fort Wayne, Greensboro, N. C., Houston, Indianapolis, Jacksonville, Kansas City, Mo., Los Angeles, Memphis, Milwaukee, Minneapolis, New Orleans, New York, Philadelphia, Pittsburgh, Portland, Ore., Richmond, Rochester, N. Y., San Francisco, St. Louis, Seattle, Washington, D. C.

BUDELMAN
bec

2000 MC MICROWAVE RADIO TERMINALS

New, low-cost microwave equipment for the 2 KMC band, Budelman type 14/CW, employs MONO-BLOC head-ends and final amplifiers for better stability and insurance against early obsolescence.

- 30 voice channel capacity
- 5 watts output
- 0.0005% frequency stability
- ± 200-KC FM
- wide-band (0.3-150 KC)
- low initial and maintenance costs

Write for Bulletin 1260

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5706 BALSAM ST., ARVADA, COLORADO

THE ENGINEERING SERVICE
P.O. BOX 178, BUTTE, MONTANA

J. W. FLINT
325 VIRGINIA, PONCA CITY, OKLAHOMA

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SPACECOM, INC.
2331 FOURTH ST., SANTA ROSA, CALIF.

TELE-RADIO SYSTEMS LTD.
3633 DUNDAS ST., TORONTO 9, ONT.

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WESTREX, CORP.
540 WEST 8TH AVE.
NEW YORK 19, N. Y.

LETTERS FROM READERS

"The New Competition"

TO THE EDITOR: — "The attached editorial 'The New Competition' taken from the *Telephone Engineer & Management* magazine, April 15, 1960 issue, was reprinted by the American Telephone & Telegraph Co., Administration-R Department. Two hundred copies were printed and distributed to our Revenue Requirements people throughout the Bell System. . . ."

C. A. Parker,
Staff Assistant,
American Telephone & Telegraph Co.,
195 *Broadway,*
New York 7, N. Y.

"Memo To Advertisers"

TO THE EDITOR:—"In the Letters' dept. of a recent issue of *Telephone Engineer & Management* I noted the letter headed 'Justifiable Complaint' from 'Disgusted!'

"Over the past year, I have answered no less than a dozen advertisements applying for work and I have yet to receive my first acknowledgement. I, too, agree that common courtesy dictates that if someone answers, a reply is in order, even if only a thank you.

"For the sake of others who have also had similar experiences, I hope that an article can or will be written on this subject, and that your advertisers take heed and do a man the courtesy of acknowledging receipt of an application, regardless of whether or not the would be employe meets the qualifications of the prospective employer, or whether the job is already filled."

Also Disgusted.

"That Excise Tax"

TO THE EDITOR: — "In accordance with the requirements stated below the editorial, 'That Excise Tax Expiration Date,' in the January 15, 1960, issue of *Telephone Engineer & Management*, I am sending you four copies of the March-April issue of our company magazine, *The Transmitter*. You will find the editorial reproduced on page 19, together with the specified credit line.

"This issue of our magazine has a circulation of about 40,500. We are most appreciative of your courtesy in permitting us to use the editorial and hope, with you, that it will have the desired effect."

Carl H. Claudy, Jr.,
Editor,
The Transmitter,
Chesapeake & Potomac Tel. Co's.,
1710 *H St., NW,*
Washington 6, D. C.

"Glad You Liked It"

TO THE EDITOR: — "The editorial 'The New Competition' which appeared in the April 15, 1960 issue, has been reprinted for distribution to 150 supervisors in the Chicago installation area."

D. K. Turner,
Western Electric Co.,
Chicago Installation Area,
205 *W. Wacker Dr.,*
Chicago 6, Ill.

"Glad You Used It"

TO THE EDITOR: — ". . . Your editorial in the April 15 issue — 'The New Competition' — is, I feel, of particular interest to the readers of my INDUSTRIAL COMMUNICATIONS Weekly News Service, who are actually on both sides of the fence in the radio field since we have large numbers of both telephone people and radio users among our subscribers. . . ."

Robert E. Tall,
Editor,
Industrial Communications,
1208-1216 *National Press Bldg.,*
Washington 4, D. C.

"Letter To A Subscriber"

TO THE EDITOR: — "Enclosed are four copies of the 'Letter to a Telephone Subscriber.' Our company had 450 copies made of this letter and they have been mailed to our subscribers. We have also sent the

You're miles (and dollars) ahead with

CABLEGARD™*

New Butler Cablegard™ is a split-pipe sheath for cable . . . gives the protection of solid-wall pipe or conduit, yet installs in minutes—with no special skills needed! It's flanged to *clamp around cable*, avoids the cost of time-consuming cutting and splicing.

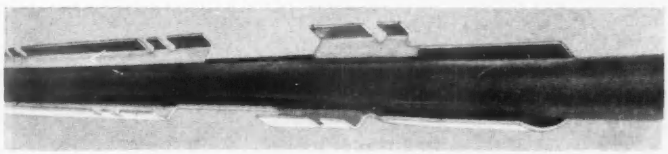
Cablegard is the fastest, lowest-cost way to take cable under stream beds, over culverts, across rock ledges—anywhere, above or underground. Works fine below sidewalks or as terminal shielding . . . use it wherever steel protection is needed.

Approved by R.E.A. (see REA Bulletin 344-2) . . . hailed by cost-conscious companies, Cablegard is a tested, *proven* product. It will, literally, put your plant construction program miles and dollars ahead! Contact your telephone equipment supply house, or write to us for full details.

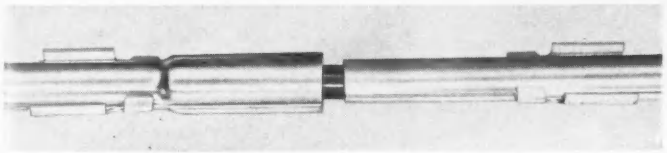
Clamps around cable, eliminates most splicing

*PAT PENDING

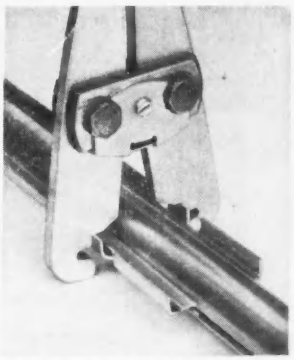
the protection of solid-wall pipe . . . above or underground



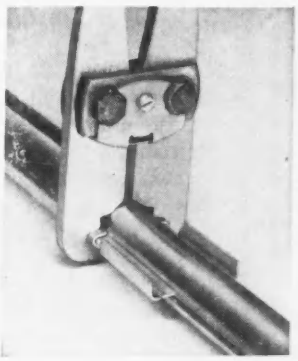
1. Place cable in bottom half of Cablegard (flanges up).



2. Lay top of Cablegard section over cable. Belled ends must match. Sections come straight or pre-curved, fit perfectly.



3. Open tool. Fit tabs into notches in tool jaws.



4. Close tabs—joints are securely locked.

BUTLER®

BUTLER MANUFACTURING COMPANY CONTRACT MANUFACTURE DIVISION

7558 East 13th Street, Kansas City 26, Missouri

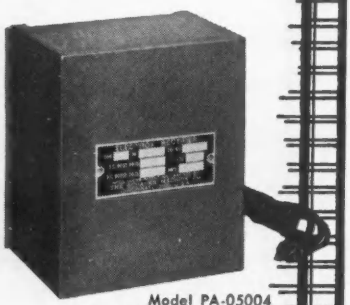
Manufacturers of Metal Buildings • Equipment for Farming, Oil Transportation, Outdoor Advertising • Contract Manufacturing

Factories at Kansas City, Mo. • Minneapolis, Minn. • Galesburg, Ill. • Richmond, Cal. • Birmingham, Ala. • Houston, Tex. • Burlington, Ont., Can.

BE SU-RRR-E!

Make SCHAUER your source for dependable DC POWER!

SCHAUER is recognized by the Telephone Industry throughout the world as a leading manufacturer of battery eliminators and battery chargers for almost every DC power requirement. You save with Schauer—on low first cost, low operating cost, and reliable service. See your Jobber or write for Bulletin No. 1470.



Model PA-05004
Schauer Battery Eliminator

Here's a sure SCHAUER power source for the operator's circuit on magneto switchboards

Schauer Type PA-05004 Battery Eliminator delivers constant, hum-free direct current to the operator's circuit. Equipped with relay for automatically transferring power to stand-by dry cells in the event of AC failure. Standard capacity is 4 volts DC at 0.5 amps. Steel case, for wall mounting is 5½"x6¼"x4".

Rectifier Division
SCHAUER
MANUFACTURING CORP.
4516 Alpine Ave., Cincinnati 42, O.

name and address of the person to whom they should direct their letter.

"Thank you for the privilege of making the reprint from your magazine."

Arthur C. Schimmoeller,
Manager,
The Ottoville Mutual Telephone Co.,
Ottoville, Ohio.

"We Hope So, Too!"

TO THE EDITOR: — "Your editorial on the telephone excise tax ('Dateline — Washington, D. C., July 1') in the May 15 issue was excellent. I could not refrain from printing 70 copies for distribution to some of our top management here in Utah.

"I hope our industry is successful in getting the excise tax off the telephone bills. Your help is certainly appreciated."

Frank D. Sawyer,
Assistant Vice President,
Mountain States Tel. & Tel. Co.,
Salt Lake City, Utah.

"Glad We Could Help"

TO THE EDITOR: — "We are very pleased to report that there has been a full enrollment for the 1960 Telephone Engineering Conference at Michigan State University. As of the latest count, 62 applications have been received and, giving consideration to last-minute changes, this should result in a class of about 60 students, which was our objective.

"I certainly wish to thank you and your organization for the fine publicity and cooperation which you have provided. . . ."

Russell J. Loveland,
Director,
Subcommittee on Engineering Edu.,
California Water & Telephone Co.,
300 *Montgomery St.,*
San Francisco 4, *Calif.*

"We'll Publish It Soon"

TO THE EDITOR: — "Periodically you list excellent textbooks available through your educational division. Would it be possible in some future edition to summarize books available? From comments I have received, I believe this might be profitable to many.

"Continue your excellent work on producing a publication for the telephone industry. You please the most."

Thomas S. Sullivan,
Transmission Engineering,
Western Electric Co.,
220 *Church St.,*
New York 13, *N. Y.*

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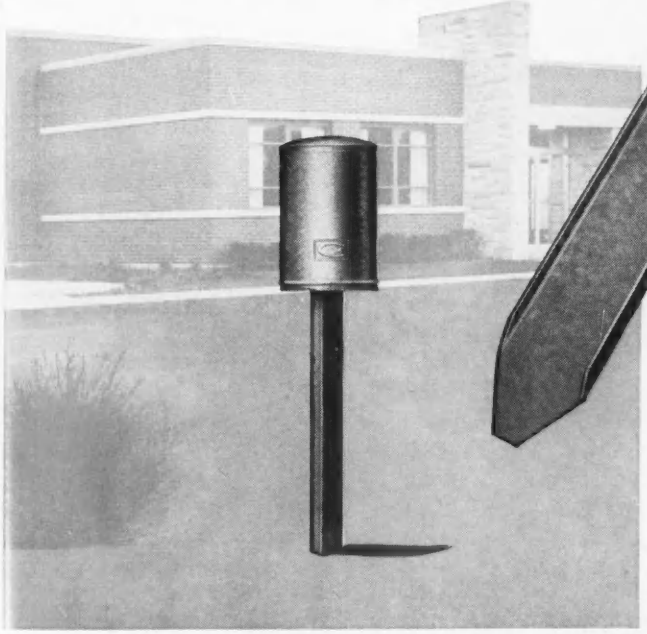
Install Cook BD type Pedestals in your buried wire and cable plants to save time and money. The advanced design features, and more accessible termination, protection and loading facilities, allow for easier and faster pedestal installation and equipment termination.

The cover is removed quickly by loosening one screw. The removable terminal bracket permits easy mounting of terminals, protection and loading coils. The spacious interior allows plenty of room for wires and cables, and makes terminating, loading and splicing easier.

BD Pedestals can be ordered with Cook Hi-Fi Loading Coils and 3C protected or unprotected Terminal Blocks to fit your specific requirements.



Complete installation of Cook BD Pedestal No. 521-120 for up to 100 pair, 22 gauge underground plastic cable.

Showing completed No. 521-119 BD Pedestal for up to 18 pair, 22 gauge cable or cable and wire installation.

COOK ELECTRIC Company

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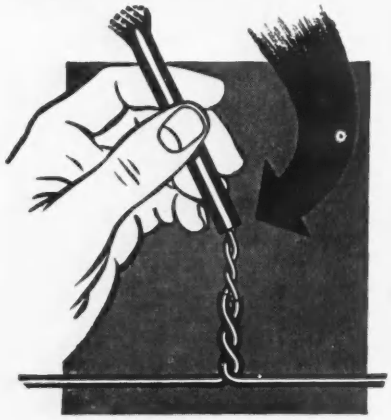
"Super-Splice"®
makes splices
waterproof
...from
inside out!

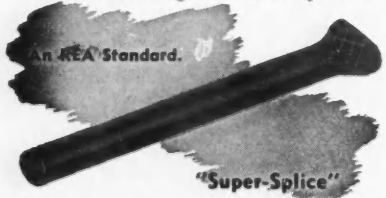


Superior Cable's exclusive economical "Super-Splice" is a plastic splice sleeve. It is sealed at one end and comes to you filled with an insulating and waterproofing compound.*

"Super-Splice" prevents leakage currents and breakdowns in the presence of moisture . . . good for 25,000 v. d. c.

Can be easily removed to reenter the splice . . . the compound never hardens or oozes out no matter what the temperature.

**A Dow-Corning silicone compound.*



"Super-Splice" is available for use with straight, butt or bridge splices.

For further information on economical "SUPER-SPLICE", write

SUPERIOR CABLE
SUPERIOR CABLE CORPORATION
Hickory, North Carolina

"Off The Board"

Communications Securities

Markets as of May 27, 1960	DIVIDEND	BID	ASKED	LAST SALE
American Tel. & Tel.	3.30			88⅝
Anglo-Canadian Tel. (Brit. Col. & Dom. Rep.)	1.20	39¼	41½	
Bell Tel. of Canada	2.20	44⅝	45	
British Columbia Tel.	2.20	44½	47½	
Calif. Interstate Tel. (Calif., Nev.)	.70	12¾	13¾	
Calif. Pac. Util. (Calif., Ore., Nev.)	.90	19½	21½	
Calif. Water & Tel.	1.28	27	28½	
Carolina Tel. & Tel.	1.60	38	—	
Central Elec. & Gas (Minn., Ill., Ia., Wis., Va.)	1.00	24⅝	26⅛	
Central Telephone (Minn., Ia., N. C., Va.)	.88	21	22½	
Chenango & Unadilla Tel. (N. Y.)	1.20	26	29½	
Cincinnati & Suburban Tel.	4.50	90	95	
Citizens Utilities (Calif., Pa.) "A"	stk. only	14	15	
Citizens Utilities (Calif., Pa.) "B"	.52½	13½	14½	
Commonwealth Tel. Co. (Pa.)	.90	20½	22½	
Florida Telephone Co.	1.00	28¾	30	
General Telephone & Electronics	2.20			31⅜
Hawaiian Telephone Co.	1.00	22	24	
Indiana Telephone Co.	.50	22	—	
Inter-County Tel. & Tel. (Fla.) (new stock)	.72+stk.	23½	26½	
Inter-Mountain Tel. (Va. & Tenn.)	.80	15¾	16¾	
Jamestown Telephone (N. Y.)	5.60	80	—	
Lincoln Tel. & Tel. (Neb.)	2.60	63½	—	
Lorain Tel. Co. (Ohio)	1.40	32½	—	
Middle States Tel. Co. (Ill.)	1.00	29	31½	
Mountain States Tel. (Ariz., Colo., Mont., Tex., etc.)	6.60			190¾
New England Tel. & Tel.	1.72			34⅞
North Carolina Tel.	none	1 5/16	1 1/16	
Northern Ohio Tel.	1.60	53	56	
Pacific Tel. & Tel.	1.14			28
Peoples Telephone (Pa.)	4.00	93	—	
Pioneer Tel. Co. (Minn., N. D.)	1.00+stk.	36	39	
Rochester Telephone (N. Y.)	1.00			23⅞
Southeastern Tel. (Fla.)	.90	21¾	23½	
Southern New England Tel.	2.20	43	45½	
Southern Nevada Tel.	1.00	22¾	24¾	
Southwestern States Tel. (La., Ark., Okla., Tex.)	1.20	23½	25	
Telephone Serv. Co. of Ohio "A"	2.80	180	210	
Telephone Serv. Co. of Ohio "B"	2.80	185	—	
Tidewater Telephone Co. (Va.)	1.40	25	—	
United Utilities	1.40	39	41	
West Coast Tel. (Wash., Ore., Calif.)	1.20	24¾	26¾	
Western Union Telegraph	1.40			48⅜
Western Utilities	.36	7⅝	8⅛	
Western Light & Tel. (Mo., Ia., Kans.)	2.00	43½	46½	

(Source of market — DEAN WITTER & CO.)

NEW EXIDE SILICON DIODE TELEPHONE RECTIFIER

- **Ageless Silicon Diodes**
- **Maintenance-Free Circuitry**
- **±1% Voltage Regulation**
- **Improved Filtering**

Here is the float rectifier the telephone industry has been waiting for . . . a telephone battery charger by telephone battery people . . . a proven design now operating in hundreds of utility float battery installations.

You don't have to adjust the regulating equipment constantly to suit aging rectifiers, because silicon diodes do not change characteristics with time. Your rectifier lasts longer, needs practically no attention. You have a choice of several a-c voltage taps which allow proper initial selection for closest regulation.

A magnetic amplifier charging regulator without moving parts helps assure you of consistent voltage regulation within ±1% all the way from *zero* to full load current at the float voltage setting. This includes the particularly important 0 to 15% range.

26 models cover all standby battery applications in the telephone field. Write for more information on the one that suits your application to: Exide Industrial Division, The Electric Storage Battery Company, Philadelphia 20, Pa.

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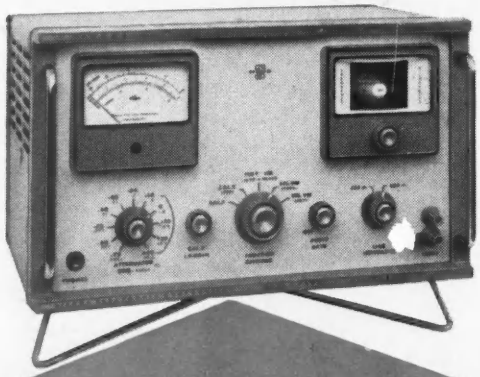
New performance
New design
New appearance



TUNABLE, dual selectivity
plus
Flat VTVM feature

Sierra Model 125A

FREQUENCY SELECTIVE VOLTMETER

Model 125A is an all-new vacuum tube voltmeter incorporating features of several previous Sierra instruments in one compact, high-performance instrument.

Covering the frequency range of 3 to 600 KC, this new voltmeter has both narrow and wide selectivity settings plus a flat voltmeter position. This triple mode measurement capability makes the Model 125A an extremely versatile instrument for carrier measurements, wave analysis and general laboratory use. Brief specifications are listed at the side. For full information and demonstration, call your Sierra representative or write direct.

SPECIFICATIONS

Frequency Range
Tunable Mode: 3 KC — 600 KC
Flat Mode: 1 KC — 600 KC

Measurement Range
Tunable Mode: –90 dbm to + 32 dbm
Flat Mode: –30 dbm to + 32 dbm

Selectivity
Narrow: down 3 db 125 cps off resonance
down 45 db 500 cps off resonance
Wide: down 3 db 1.25 KC off resonance
down 45 db 5 KC off resonance

Construction
Modular with etched glass epoxy circuit boards

Data subject to change without notice

sierra

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INDUSTRY OBSERVATIONS

By L. A. GRITTEN

More About Tel-Interpret

FREDO NESTLER, manager of TEL-INTERPRET, at Lüneburg, West Germany, has sent us some interesting details of his new telephone translation service. It is a system of simultaneous interpretation, similar to that used at United Nations conferences.

Tel-Interpret is not yet in commercial operation. It will be given a further trial at Bonn in the near future. After that, the first permanent Tel-Interpret center will be established at Köln (Cologne), translating from German into English, French and Dutch. The charge for interpretation will be D M 1.5 (about 35 cents) a minute.

As planned, an American headquarters — "Interpret Central, New York" — will be staffed day and night by interpreters in many languages. Anyone in the U.S.A. will be able to converse with foreigners in many countries. The American will hear and speak nothing but English; the foreigner will hear and speak only his own language. The service will be extended throughout Europe, America and Asia.

The intercepting device used by the interpreter (patented by Fredo Nestler) will be sold to large concerns, who can then employ their own interpreters to handle their foreign conversations. The Tel-Interpret service will not be operated by the government (Deutsche Bundespost) in Germany, but it will be available to private companies. Herr Nestler is looking for a carrier for the service in the U.S.A. (We understand that no such arrangement has been made by the A. T. & T. Co.)

Tel-Interpret should succeed. In this country there is a real need for such a service. We are in the throes of a desperate battle for world trade; and we are the world's poorest linguists. We cannot forever blandly expect the whole world to learn English for our benefit.

Einsteinian Solace

IT WAS a warm and placid afternoon. We reclined on a lawn chair, beside a delightful lake in central Washington, watching little long-legged birds foraging on the foreshore. Drowsily and happily, we were recovering from too much fried chicken, potatoes, beer and hot biscuits dripping with butter. But, alas, our somnolence was underlaid by the pangs of self-reproach. Guiltily, we felt that we should be fighting our Corona with both middle fingers, dashing out reams of literary jewels for TE&M. We much preferred to "eat the lotus," but the call of duty seriously disturbed our loafing.

Relief came. It was a letter from C. D. Ehinger. He hails from Decatur, Indiana, where they know all about Einstein and Newton, n' like that. His first few lines seemed to be another reproach for our laziness; he mentioned that according to Sir Isaac Newton the kinetic energy of a body — even one like ours — is proportional to the square of its velocity. No velocity, no

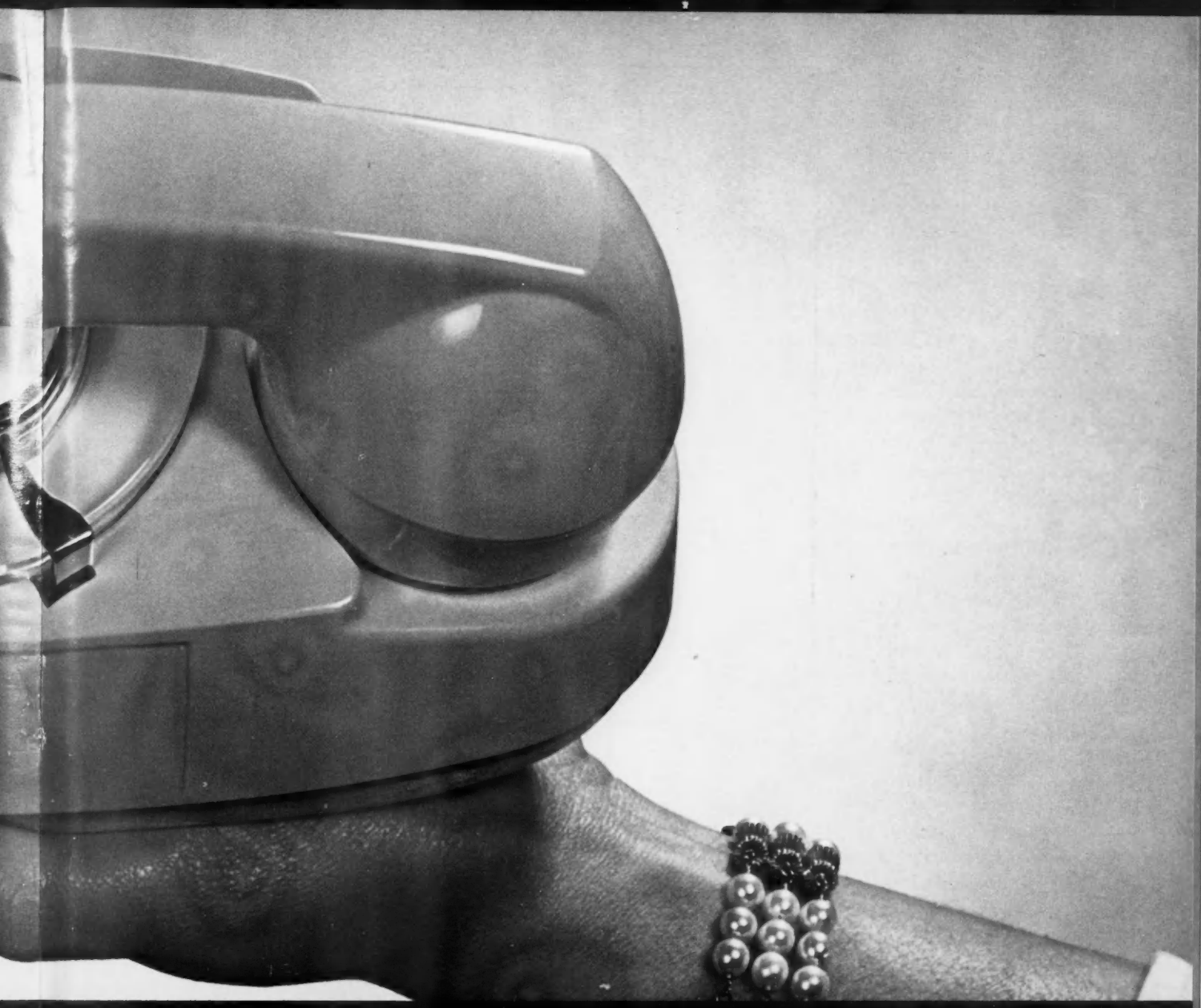
"CHARLIE," by Jim Counts

CHARLIE !! FROM BACK HOME! WHAT BRINGS YOU TO WASHINGTON?
I'M HERE TO PROTEST THE TELEPHONE EXCISE TAX!
WELL, ER... I KNOW HOW YOU TELEPHONE PEOPLE FEEL, CHARLIE, BUT THERE ISN'T A THING I CAN DO!
OH, IT'S NOT JUST TH' TELEPHONE PEOPLE... IT'S ALSO THE SUBSCRIBERS. I HAVE A PETITION HERE SIGNED BY OVER 2,000 OF THEM!
HERE, CHARLIE OLE PAL! HAVE A CHAIR! HAVE A CIGAR! HAVE TWO CIGARS! MEBBY WE CAN DO SOMETHING ABOUT THAT TAX BILL AFTER ALL!
TELEPHONE FOLKS CAN'T DO IT ALONE.. SPREAD THE WORD AROUND!
Jim Counts

...It's NEW! ...It's HERE!

The Petite

by Stromberg-Carlson



...It's SMART...it's SMALL...it LIGHTS!

This is just about the most pre-sold item to hit the industry since dial telephony!

Your subscribers will demand it—and we have conclusive customer survey and research data to prove it. The Petite will be the greatest little profit-producer you ever saw—and we have revenue figures to back that up.

Just take a look at a few of its many subscriber-pleasing features:

* The Petite is amazingly small and compact, perfect extension in any room: bedroom, kitchen, den, teen-ager's room. Can be used as a main station, too, with new compact ringer.

* Dial lights up! Glows in the dark, so the user can find it. When the handset is lifted, dial lights up brightly for easy dialing.

* High-gain 500-type transmission.

* Available in five pastel colors: white, beige, blue, pink and turquoise.

READY FOR DELIVERY JULY 15TH! In Atlanta call TRinity 5-7467; Chicago: STate 2-4235; Kansas City: HArrison 1-6618; Rochester: HUbbard 2-2200; San Francisco: OXford 7-3630.

STROMBERG-CARLSON
A DIVISION OF **GENERAL DYNAMICS**

kinetic energy. That was telling us that when we are sprawled out on a deck chair, half asleep, we are just nothing fit to discuss, a mere zero to a physicist.

Then C. D. went on to explain that Newton's observations were confined to our relationship with this earth (no breadth of outlook, that guy!), but that Einstein reasoned more loftily in terms of the entire universe. Looking at it in Einstein's exalted way, said Ehinger, our minimum kinetic energy at any time is m c^2; that is, our weight, say 160 pounds, multiplied by the square of the velocity of light. It works out at better than 154 billion billion foot-pounds, even if we omit the weight of the fried chicken and trimmings.

Now who says we are lazy? To Hades with self-reproach! We are bursting with kinetic energy! Mr. Ehinger and Professor Einstein, we thank you both. . . . We woke up in time for dinner.

Batteries — All Sorts & Shapes

EVERY telephone man knows something about batteries, even if it is only the recollection of changing dry cells in magneto telephones; but few of us have even heard of most of the batteries discussed in a recent O. T. S. publication. From old-style Leclanchés to fuel cells and nuclear batteries, there is a description, with performance data, of batteries of every kind. It is a remarkable and valuable research, particularly now that space miniaturization is opening up new fields of battery development.

It is: Fundamental Investigations of Power Sources, Volume 2, Batteries, by Emil J. Hellund, Ph D. It is distributed by the Office of Technical Services, U. S. Department of Commerce, Washington, D. C. The price is $2.25.

Information, Please

THE ARMED Services Technical Information Agency is installing the first phases of a massive transition to automation. A S T I A provides Defense agencies and contractors with copies of research reports made by or for military agencies. They receive as many as 3500 requests daily; they have about one million documents on file and add 30,000 titles every year. When the installation is completed, some 7,000,000 catalog cards will be copied on magnetic tape; and this will make it possible to print automatically the required bibliographies at 600 lines per minute, with a full descriptive abstract of each reference.

There are times when we wonder if the telephone industry's Information services are not overdue for a face-lifting.

Jekyll And Hyde

"LEWIS CARROLL," the witty genius whose "Alice in Wonderland" has delighted the world for nearly a century, was also Charles Lutwidge Dodgson, professor of mathematics, who inflicted this horror upon us:

"A" says that "B" lies. "B" says that "C" lies. "C" says that "A" and "B" both lie.

From that, kindly deduce who is lying and who is telling the truth. After consuming three cigars and several finger nails, we gave up. If you know the answer, please let us have it.

Germs

CHARLES Townsend Copeland, famous mentor of famous writers, ("Copey of Harvard," by J. Donald Adams) once refused to take a telephone call for him. The caller was informed: "Mr. Copeland never answers the telephone because there are germs in the receiver."

Amen! Descendants of those germs are still flourishing in many millions of receivers.

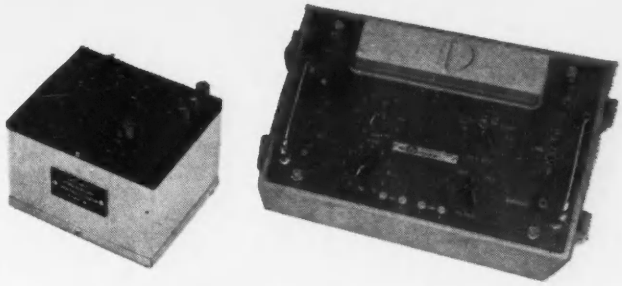
"Dust To Dust"

BY 1980, says *Science Newsletter*, 40 per cent of the "permanent" books printed in the first half of this century will be unfit to use. The paper will be too brittle and will break at a touch. That is the best thing that could happen to about 90 per cent of what is printed. Unfortunately, a great deal of the worthwhile ten per cent is not printed on the more enduring paper. — *L. A. Gritten.*

AIRTRONICS Far-end Terminating Set, designed to be used in conjunction with the Model 20B Test Hybrid, supplies the Far-end terminations required for return loss and singing-point tests.

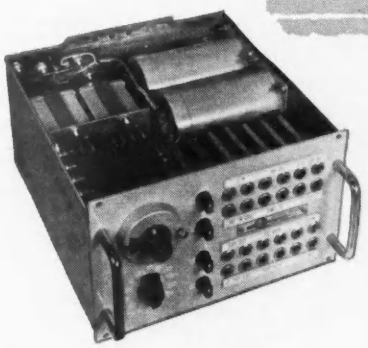
Generally, two precision networks, 115H and 115AL cover the standard cable layouts in exchange plant, (the 115H covering 19 and 22 gauge H88 facilities).

The Far-end Terminating Set consists of a precision network, network build-out decades, selector switch and jacks, and binding posts to give flexible access to the components.

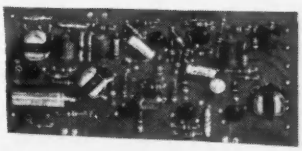


AIRTRONICS new multi-purpose, Portable Test Hybrid Set, Model 20B, makes acceptance, evaluation, and capacity balance tests easier, faster . . . locates cable opens accurately . . . accommodates standard networks. Either Singing-Point or Return Loss techniques can be applied. Accessories include external decade capacitor and variable resistor for use in locating opens, for compromise net, etc. Plug-in dial is also available.

DEPENDABLE PRODUCTS FOR MODERN TELEPHONY

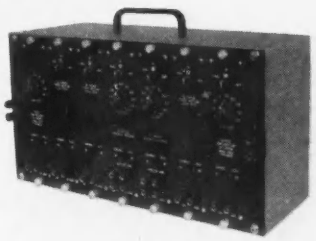


AIRTRONICS completely self-contained Program Equalizer cuts line-up time from hours to minutes. Designed for operating on standard program-loaded or non-loaded communications cables, this unit features pre-tuned circuits in 1½ KC steps from 5 KC to 25 KC. Simple switch adjustments control insertion loss of the LC network, select values of L and C, regulate line-to-drop ratios, control the circuit location of the RLC network etc. Available in portable, wall-mounting, or standard 19" or 23" rack-mounting arrangements.



The Switch-gain Amplifier — in a Speakerphone installation — functions as a voice-sensitive switching pad or loss, which *automatically* lowers loudspeaker volume whenever the subscriber is speaking. Loss is switched electronically to the transmitter channel while the subscriber listens. A guard circuit keeps speaker-to-microphone acoustic feed-back from causing improper switching when the speaker is operating. Net effect is reduction of acoustic coupling between loudspeaker and microphone to a degree where anyone, within 10 or 15 feet, can hear easily and distinctly without feedback or hollowness. Subscriber is not required to vary his gain control when shifting from a near to a more distant connection, or to toll.

AIRTRONICS Switch-gain Amplifier fits all Speakerphone models. Priced under $60 f.o.b.



AIRTRONICS standard Artificial Lines accurately simulate a loaded or non-loaded cable pair of any desired length — from 600 to 39,600 feet.* Multi-position switches afford instant control over total length or load section lengths, so that coil spacings may be set to better than 1%, or as much as 10%. Common irregularities such as bridged taps, mixed loading or coils omitted can be introduced in a moment.

*Available with plug-in units for either #22 or #24 gauge cable, or mixed 22 and 24 gauge. Other commonly used gauges available on special order.

another product FIRST from

AIRTRONICS INTERNATIONAL CORPORATION

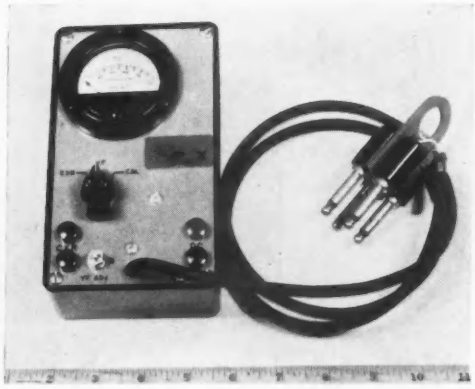
P.O. Box 8576, Fort Lauderdale, Florida (6900 West Road 84)

PANHANDLE

TRANSISTORIZED

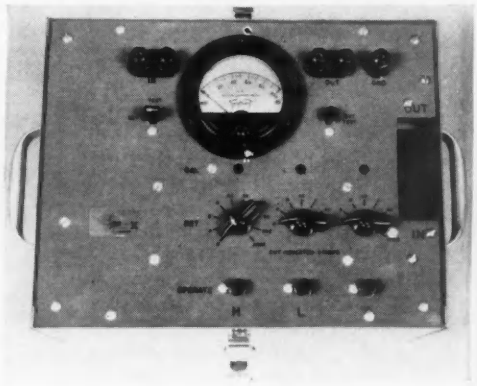
"X" CARRIER SYSTEM

PANHANDLE'S ANGULAR MODULATION allows simplification of installation and maintenance procedures never before offered to the industry. By use of two self-contained test units, the terminal and repeater equipment of the system can be installed, aligned and maintained by plant personnel without specialized electronic training. The entire lineup and maintenance concept of the X system is based on use of the two test units shown below. Each are so designed that mid-scale meter readings indicate proper alignment of the system unit.



The channel test set provides all alignment and maintenance test required at a terminal location.

1. VF Level Alignment
   - A. VF Oscillator
   - B. Bridge Rectifier VF Meter Circuit
2. D.C. Repeater Current Alignment
3. Carrier Transmit Level
4. Carrier Receive Level
5. 4KC Signal Tone Level Alignment



The repeater test set provides all alignment and maintenance test required with the repeater system.

1. Make Repeater Location Reading For:
   - A. Repeater Level Adjustment
   - B. Repeater Baseband Correction for Tilt and Twist
2. Check Repeater Adjustment in Initial Lineup or on a Working System Without System Interruption

PANHANDLE ELECTRIC SALES, INC.

1610 INDUSTRIAL COURT, ARLINGTON, TEXAS

"X" and "LL" systems marketed exclusively by

INTERNATIONAL TELETRONICS INC.

644 BRANIFF BLDG. 300 EXCH PARK DALLAS 35, TEXAS

INDUSTRY NEWSLETTER

Illinois Commission Rate Case Authority Gets Court O. K.

Chairman *George R. Perrine* of *Illinois Commerce Commission* said last month that an Illinois Supreme Court opinion upholding commission's authority had blocked a series of applications for utility rate increases.

Perrine told newsmen the opinion was major victory for commission. Written by Justice *Charles H. Davis* of Rockford, it held that Rock Island County Circuit Court should not have substituted its judgment for that of commission experts.

Case involved an application of Iowa-Illinois Gas & Electric Corp. for rate increases totaling $530,000 a year for customers in Rock Island, Henry, and Whiteside counties. It was allowed in Circuit Court.

Illinois commission allowed only an increase of $269,500 based on 5.85 per cent rate of return, which Supreme Court found was supported by the record and evidence in the case.

"We have long held that the decision of the commission is entitled to great weight as being the judgment of a tribunal appointed by law and informed by experience," said the Davis opinion. It referred to the commission as a "specialized and expert body."

The commission valuation of the utility was fixed on a formula of approximately 75 per cent depreciated original costs and 25 per cent reproduction costs. The company had asked for a 50-50 formula.

Perrine said that had the commission been reversed, Iowa-Illinois rates would have almost doubled and that other utilities would follow with applications for rate increases.

Telephone Industry Backs Legislation Prohibiting Use of Slugs

Measure to prohibit use of slugs and other devices similar in size and shape to U. S. money, was strongly supported in statements to a House Judiciary subcommittee by AT&T and the U. S. Independent Telephone Association. AT&T Executive Vice Pres. *E. J. McNeely* said losses to Bell System companies from slugs and other devices "amount to about $800,000 annually." USITA, in a letter from Counsel *Bradford Ross*, told the House panel that Independent telephone companies suffer a "substantial loss in revenue" because of the use of slugs and other devices. He noted that the Independents have in service about 100,000 coin telephones.

Indiana PSC Appeals Held Untransferable

Appeals from decisions of the Indiana Public Service Commission must be decided by the Appellate Court and it cannot transfer the cases to the State Supreme Court, it was ruled by the latter tribunal last month.

The Supreme Court, in an opinion written by Judge *Arch N. Bobbitt*, said the Appellate Court cannot vote evenly on an appeal from the commission and then transfer the case to the high court for determination.

The Appellate Court in September, 1958, was asked to void a commission order for a long-distance telephone rate increase for 180 companies which had not asked for the boost.

The rate hike had been granted to *Indiana Bell Tel. Co.* in an order which said all telephone companies in the state could raise their rates to match Indiana Bell.

Public Counselor George L. Diven appealed the ruling to the Appellate Court, which voted 4-4 on the case and transferred it to the Supreme Court.

Please turn to page 24

INDUSTRY NEWSLETTER

(Concluded from page 23)

Senate Kills Bill Providing FCC Regulation of CATV

Bill which would have required FCC to license and regulate community antenna television systems similarly to its present program of regulating radio and television stations was killed by Senate last month. Measure was recommitted to Interstate & Foreign Commerce Committee by 39-38 vote, and move to reconsider action was rejected, 38-36.

Measure was opposed by National Community Television Association. FCC supported general approach to problem, but offered alternative legislative suggestions.

Bell System Adopts New Sales Plan For "Yellow Page" Ads

Yellow Pages advertising in classified directories of telephone companies can now be purchased by advertisers in any market in the United States and Canada simply by placing single order through one contact, it was announced last month. By means of new system, advertisers can now place space in as many directories as they want through one contact, signing one contract, and receiving just one monthly bill.

Former method required agencies to negotiate contracts with individual Yellow Page sales offices for space in more than 4000 directories. These directories have over 90,000,000 circulation.

Announcement of new Yellow Pages advertising method was made at live, dramatic presentation before 250 advertising executives in New York City. Presentation will be offered later in a number of other cities.

USITA Opposes Legislation That Would End 750-Station Exemption Under Minimum Wage Law

Opposition to proposals that would end the 750-station exemption under the minimum wage law was repeated last month in testimony to a House Labor subcommittee by *Clyde McFarlin*, pres. of the *Montezuma, (Iowa) Mutual Tel. Co.* on behalf of the U. S. Independent Telephone Association. McFarlin urged that the exemption be continued so that telephone companies can proceed "in an orderly manner" with their dial conversion programs.

Industry News Highlights

Election as vice presidents of *American Telephone & Telegraph Co.* of *S. Whitney Landon*, assistant to the president and secretary of AT&T, and *Prescott C. Mabon*, assistant to the president, was announced last month. Landon will continue as secretary, a post he has held since 1952. . . . . Silver Medal Award of the Poor Richard Club of Philadelphia was presented to *Maj. Gen. R. T. Nelson*, U. S. Army Chief Signal Officer, last month in honor of 100th anniversary of founding of Signal Corps. Award was made during luncheon meeting at which General Nelson addressed the club and reviewed accomplishments of Signal Corps.

Bids for number of pole line hardware items are to be submitted by July 15 to the *Imperial Board of Telecommunications, Addis Ababa, Ethiopia*, it was announced by Department of Commerce. Copy of call for bids is available from Bureau of Foreign Commerce Trade Development Division. Items to be purchased include steel crossarms, transportation brackets, glass insulators, and pole tops. . . . . *Mountain States Tel. & Tel. Co.* stockholders will vote at special meeting July 19 to split stock eight for one. Under the proposal they will be asked to approve change in authorized capital stock from $450 million — 4,500,000 shares of $100 par value each — to $700 million, divided into 56 million shares of $12.50 par value.

a report on the "three-arm telephone" market

Recently we disclosed the possibility that we might proceed with the development of a smaller, lightweight, two-piece phone that would be ideal for three-armed people.

We know that intelligent marketing begins with customer oriented product development.

That is why we asked you—the Independent Operating Companies—how large the market might be for this "three-handed" telephone.

All the returns received to date represent a preponderance of evidence pointing up one absolute fact; **there just are not enough three-armed people to represent any market at all!**

Accordingly, we have decided to give up, at least temporarily, development of the "three-armed phone".

We shall continue to market phones for ordinary people—the N-541 desk and N-546 wall phones for those who still want a two-piece phone—the Ericofon for those who want the beautiful, lightweight, modern, upright one-piece phone with the dial in the base.

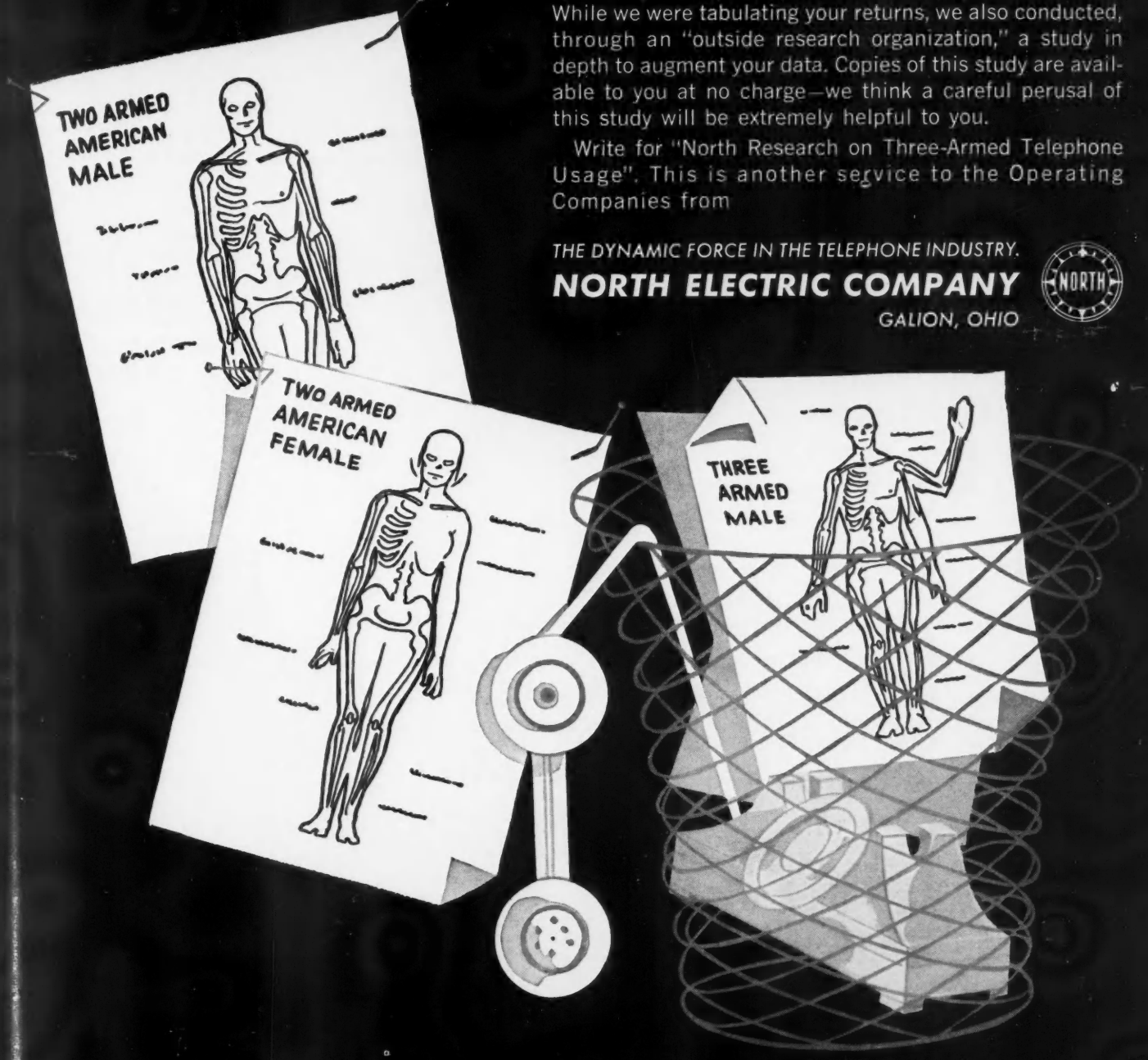
We are deeply grateful for the assistance rendered us by the Operating Companies in making this decision. While we were tabulating your returns, we also conducted, through an "outside research organization," a study in depth to augment your data. Copies of this study are available to you at no charge—we think a careful perusal of this study will be extremely helpful to you.

Write for "North Research on Three-Armed Telephone Usage". This is another service to the Operating Companies from

THE DYNAMIC FORCE IN THE TELEPHONE INDUSTRY.

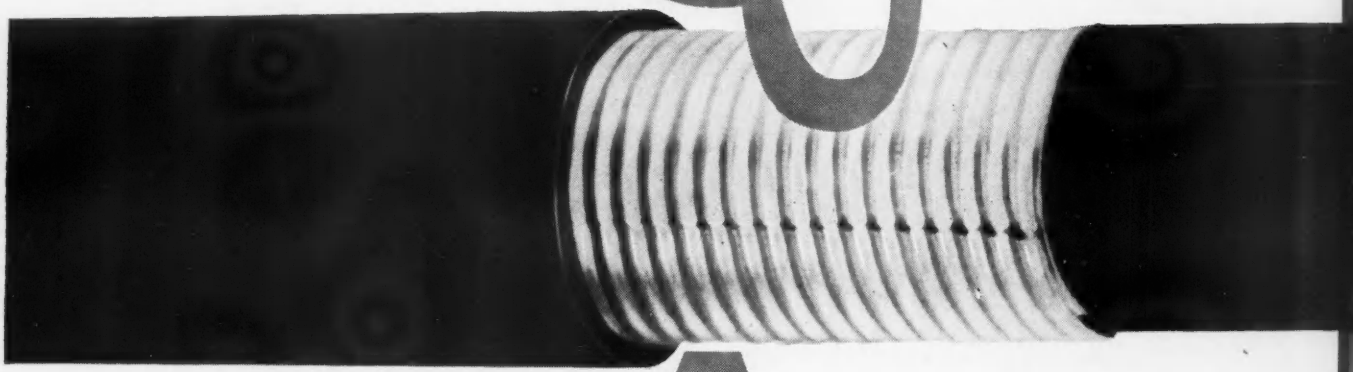
NORTH ELECTRIC COMPANY

GALION, OHIO



Are you installing 1 cable for exchange and another type for trunk

?



Not if you use General Cable Alpeth

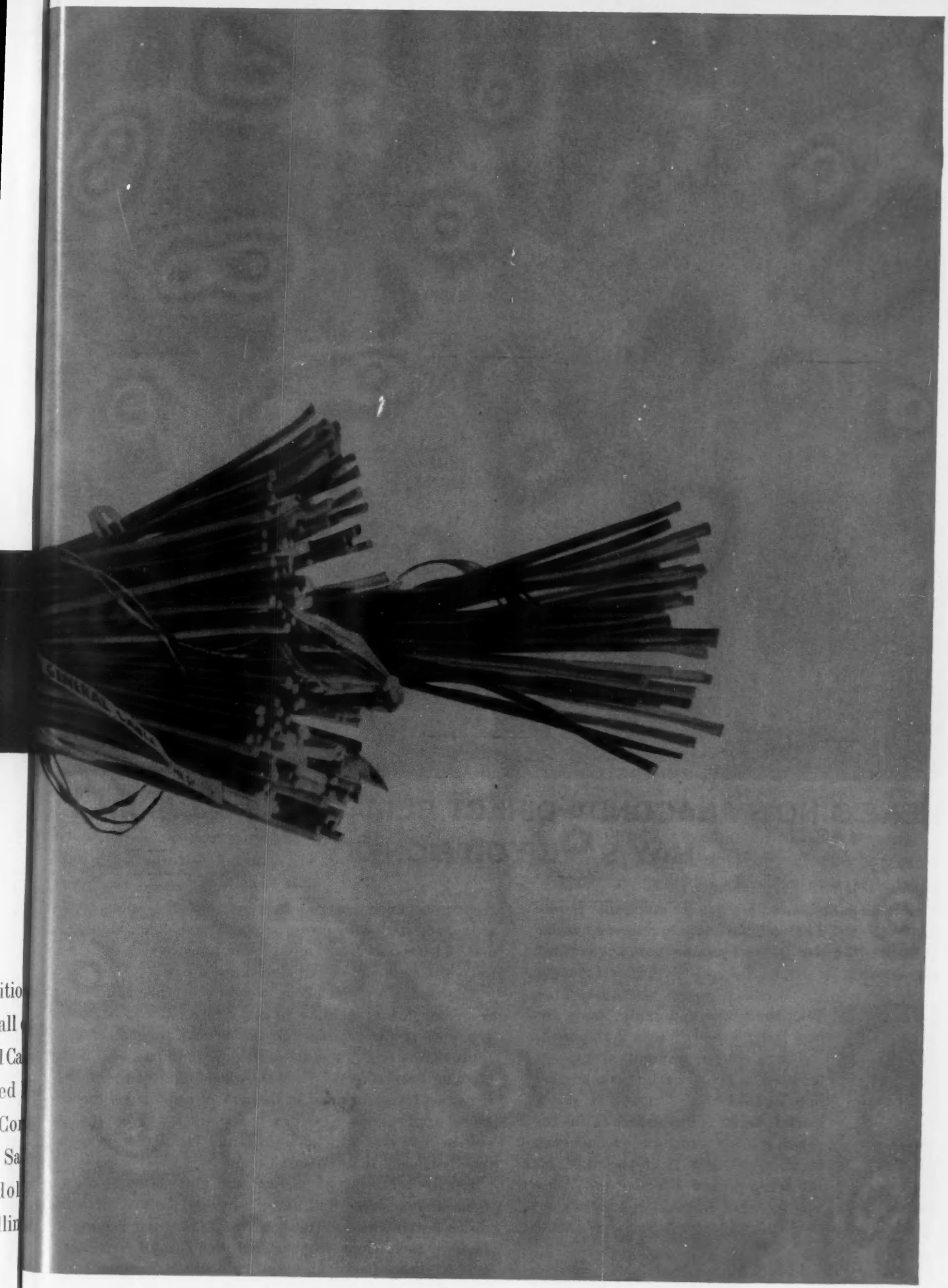
it meets the requirements for both

Only General Cable's Alpeth can be used interchangeably as a trunk or exchange cable. With engineered quality exceeding all known specifications, General Cable manufactures the finest Alpeth cable available to the Independent Telephone Industry ...no other can match it.

For further information on additio uses and special Alpeth types, call distributors for the new General Ca Alpeth brochure. Distributed Automatic Electric Sales Co Northlake, Illinois; Leich Sa Corp., 427 West Randol Street, Chicago 6, Illi

GENERAL CABLE CORPORATION

730 Third Avenue, New York 17, N.Y. / Offices and Distributing Centers Coast-to-Coast



HERE'S HOW ANACONDA DIRECT BURIAL WIRE & CABLE MAY SAVE YOU MONEY

New advances in insulation and jacket materials, termination equipment and plowing techniques now, make Direct Burial Wire and Cable Systems more economical in many areas.

Telephone wire and cable plants are now being buried directly in the earth.

That's where Samuel Morse attempted to place the first commercial line in 1843. He designed a direct burial, fully color-coded cable for America's first telegraph line between Washington and Baltimore, but his insulation proved defective and Morse was forced to take the conductors out of the cable, separate them and string them on poles with crossarms.

Now, the four freedoms of buried plants – (1) freedom from storm damage, (2) freedom from tree clearing and retrimming expenses, (3) freedom from the safety hazards associated with power contacts and pole climbing, and (4) freedom from right-of-way procurement difficulties – can be yours at actual savings in cost.

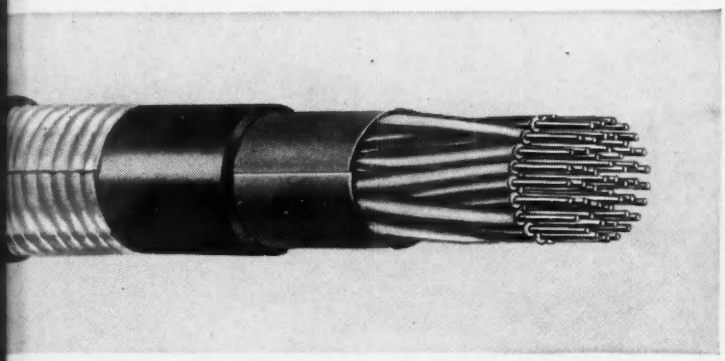
Anaconda's high-molecular weight polyethylene insulation – tough and resistant to many direct burial hazards – is part of the reason. The use of this rugged, crack-resistant material, together with new terminals and new plowing developments, have overcome most of the problems that formerly stood in the way of economical direct burial applications. Now in selected areas, a direct burial system may cost you less – in initial installation and in maintenance – than an aerial plant!

On the following pages, you will find pertinent questions and answers that show why and how Anaconda direct burial wire and cable may make possible important savings. Read these pages. Then give careful consideration to direct burial wire and cable for *your* telephone system.

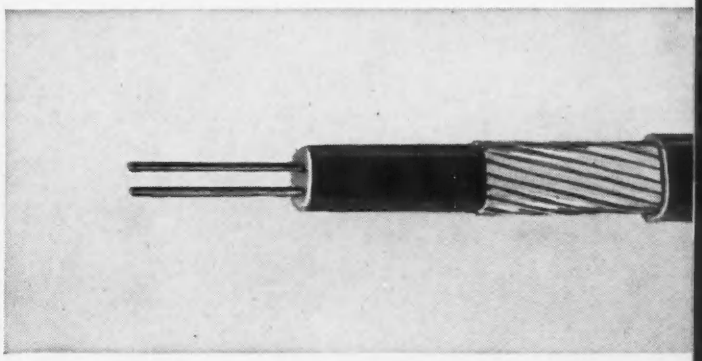
THE INSIDE FACTS ON

THE CONSTRUCTION OF ANACONDA DIRECT BURIAL TELEPHONE WIRE AND CABLE

See for yourself why Anaconda Direct Burial Telephone Cable resists underground hazards . . . gives long life and dependable service



TYPE PCP AND PCPG



TYPE BW

DIRECT BURIAL CABLE:

Cable Core: Conductors insulated with high-molecular weight color-coded polyethylene provide excellent electrical properties with great mechanical toughness and crushing resistance.

Inner Jacket: This inner jacket consists of high-dielectric strength polyethylene. It provides a second line of defense against moisture penetration in the event that the outer jacket is damaged. It also provides a high-dielectric strength barrier against lightning impulse breakdowns between the pairs and the shield.

Shield: The PCP type has 5 mils of longitudinally applied *copper* tape, rather than aluminum tape used in aerial cable. The copper provides a corrosion-resistant, low-resistance shield. This shield, coupled with the high-dielectric strength of the inner jacket, makes the over-all cable highly resistant to lightning damage. The copper shield also provides mechanical protection against the attacks of termites and rodents.

In areas where gophers are known to exist, additional protection against attacks by these rodents has been found necessary. For this purpose, the copper shield thickness has been increased from 5 mils to 10 mils and cables with this shield thickness are designated PCPG.

Outer Jacket: High-molecular weight polyethylene, highly resistant to abrasion, weathering, moisture, fungus, corrosion and environmental cracking.

DIRECT BURIAL WIRE:

Insulation: Conductors insulated in parallel with black high-molecular weight polyethylene. The insulated core has a rounded oval shape to facilitate tight fit of the steel armor wires – thus minimizing capacitance unbalance to ground.

Shield: A helical serving of closely spaced flat steel wires for mechanical protection against attacks of termites and rodents. The shield wires are flooded with an asphaltic base compound to resist corrosion. The shield, coupled with the very high-dielectric strength of the core, provides excellent resistance to lightning damage. The helical method of application of the shield wires also results in their contributing substantially to the tensile strength of the wire (over 400 pounds) which is needed to withstand stresses in installation and operation.

Outer Jacket: A tough, flexible thermoplastic jacket provides added mechanical protection for ease of installation and longevity of operation.

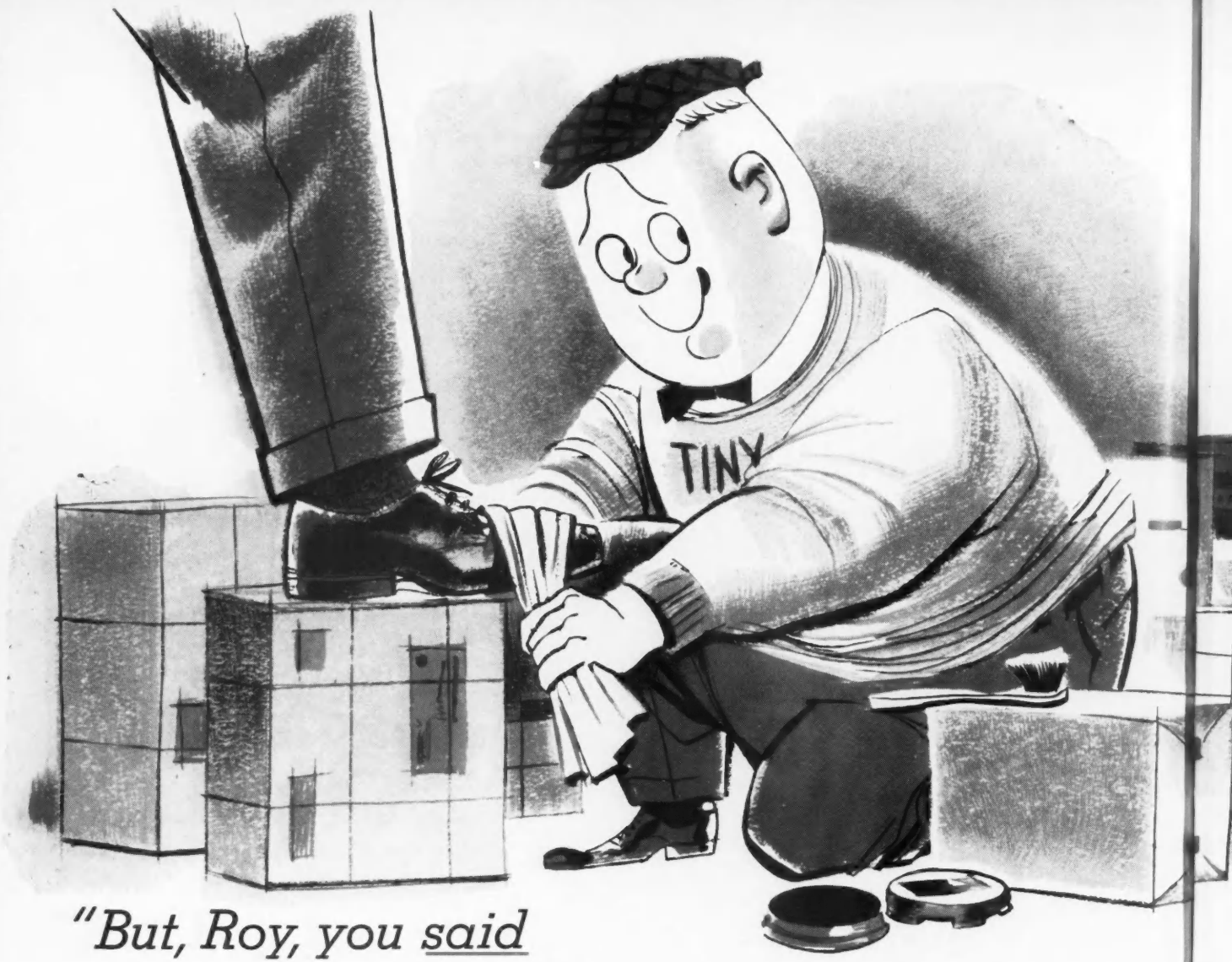
60243

PHONE THE MAN FROM

ANACONDA®

FOR TELEPHONE CABLE

the independent manufacturer for the independent telephone industry



"But, Roy, you said

AE Supply Orders must b

Shoeshine with your supply order? Some of our customers like Tiny's idea. But, that isn't quite what Roy meant when he said that each supply order must be handled in a friendly, courteous manner.

Even Tiny can understand this. AE expects to be in the telephone supply business for many, many years ahead. This means we must give you friendly, courteous service. It also means we must provide *prompt delivery* from a *large stock* of *famous brands*. Give us a call today. Let us prove again that—at AE, you get all 3.

handled in a courteous manner!"

at AE you get all 3

PROMPT DELIVERY
LARGE STOCKS
FAMOUS BRANDS

warehouses:

Northlake, Illinois Fillmore 5-7111	2915 Moore St. Richmond 21, Va. ELgin 8-9280	2360 N. W. Quimby St. Portland 10, Ore. CApital 3-7244	158 Corliss Avenue Johnson City, N. Y. SWarthmore 7-8507	2021 Main St. Kansas City 8, Mo. HArrison 1-7575

AUTOMATIC ELECTRIC

Subsidiary of
GENERAL TELEPHONE & ELECTRONICS

GENERAL SYSTEM

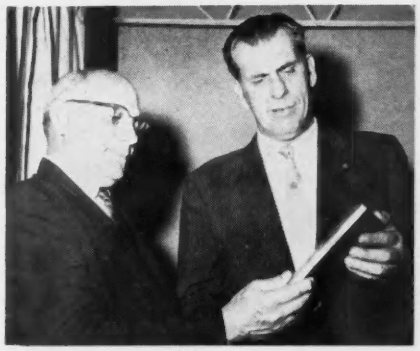
INDUSTRY VIEWS

Wilson College Government Association president, MISS ABBY VIEHE, shares the thrill of talking to her mother on the inaugural Direct Distance Dialing call from Chambersburg, Pa. (United Utilities System) with State Senator and College Vice President DOUGLAS ELLIOTT. After dialing and speaking with her mother in Quakertown, Pa., Miss Viehe described the new 3-D service as "simply wonderful." United's new system, which serves 19,000 stations in eight exchanges, provides complete operator-free toll dialing to all classes of service.

CHARLES HOWARD, center, of General Cable Corp., outlines the features of splice closures for aluminum sheathed cable during the telephone cable workshop held at the Ashtabula (Ohio) Telephone Co. From left are ROY SAVAGE, Automatic Electric Sales; HOWARD; ROBERT BONNAR, Ashtabula Telephone; and IRVING KOLODNY of General Cable.

TOM BEGGETT of Northern Ohio Telephone Co. demonstrates how to make a splice during the telephone cable workshop held recently at the Ashtabula (Ohio) Telephone Co.

Directors of the Indiana Telephone Association: Front Row (l. to r.): R. V. ACHATZ, Aurora; S. K. TRIPPET, Princeton; FRANCIS SIMPSON, Winchester; CLARK MULL, Knightstown, 2nd vice-president; L. H. MEYER, Fort Wayne, President; VIRL WATKINS, Princeton; C. D. EHINGER, Decatur, retiring president. Back Row: GEORGE A. SCHUMACHER, Indianapolis, secretary-treasurer; LaMAR S. STOOPS, Nappanee, JOHN HARBAUGH, Sullivan; HARRY PURCELL, JR., Rising Sun; C. KIGHTLY TRIPPET, Kirksville; W. J. SCHEIDLER, Greensburg; R. R. HIRSCHMAN, Indianapolis. Not present for the picture: Hugh A. Barnhart, Rochester; Roy C. Echols, Indianapolis; G. A. Steele, 1st vice-president, Warsaw; J. F. Van de Vusse, Fort Wayne; Don Van Fleit, Garrett.



At a luncheon following the installation of General Telephone Company of the Southwest's 300,000th telephone, E. H. DANNER, left, president of General, presented BEN H. SLOANE, manager of Alcoa's Point Comfort, Texas, operations, with a plaque commemorating the event.

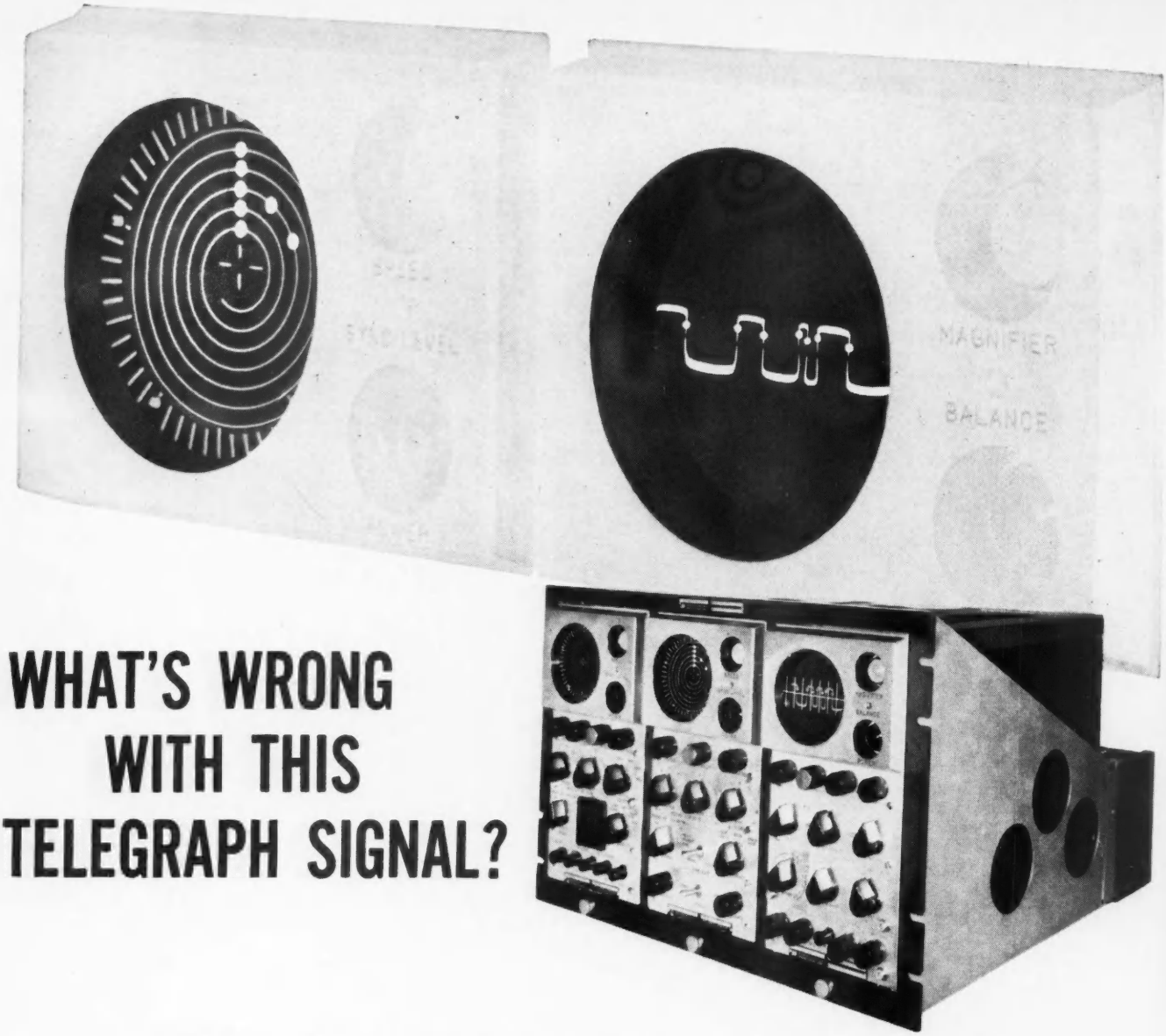
CHARLES LUTHER, of Palacios, Texas, member of General Telephone of the Southwest's board of directors, checks out the 300,000th telephone installed by General. Onlookers from left are G. HOWARD BRIGGS, the company's operating vice president, B. H. SLOANE, manager of Alcoa's Point Comfort, Texas, operations, where the telephone was installed, and E. H. DANNER, General's president.

The 250,000th telephone in service with the General Telephone Co. of Michigan is turned over to MRS. DALE W. ZUFELT of Muskegon, Mich., by FRED F. HILGEMAN, right, Western division manager, as JAMES E. MILLER, combinationman, looks on.

Cutting communication facilities into service for the Nike command post at Wilmington, Ohio, are (from left) LT. COL. CHARLES R. ARVIN, chief of Cincinnati Defense Area Command; RANKIN GIBSON, assistant to Ohio's Governor Michael V. DiSalle; COL. MURRAY BYWATER, division commander of Clinton County Air Force Base; WILLIAM OERTEL, executive director of Ohio Newspaper Association; BATES HARCUM, mayor of Wilmington; and CLARE E. WILLIAMS, president of General Telephone Co. of Ohio. General installed and will maintain radio and telephone communications for four Nike missile sites and the system's battalion headquarters.

A large newspaper advertisement recently announced the adoption of a seal for The Mansfield (Ohio) Telephone Co. The seal will appear on all company motor cars, on the doors of the buildings, outdoor booths, on the company's letterheads, on all printed matter and in all advertisements. The seal is 7-⅞ inches in diameter. Lettering is gold on olive green background.

Representatives of companies which will provide inter-site communications for the Atlas missile complex around Forbes Air Force Base, Topeka, Kan., look over the Air Force contracts. From left, are (standing) THOMAS GLEASON, Northern Kansas Telephone Co.; DAVIS WHEELER, Reno Telephone Association Inc.; EUGENE GAULT, W. E. G. Dial Telephone Co.; WILLIAM POLUMBUS, Reno Telephone Association Inc.; RAYMOND HERRICK, Kellogg Switchboard & Supply Co.; and (seated) HUBERT TREMBLAY, Kellogg; DONALD WILLIAMS, Wamego Telephone Co.; and DOUGLAS WRIGHT, Reno Telephone Association Inc. An official of the other Independent company involved, United Telephone of Kansas, Inc., was not available for the picture.



WHAT'S WRONG WITH THIS TELEGRAPH SIGNAL?

...and how do you find out without interrupting traffic?

The answer to the second question is Radiation's TDMS—Telegraph Distortion Measurement System—a compact, self-contained unit for on-line testing, analysis and monitoring of telegraph and data transmission links.

The TDMS detects, measures and analyzes signal distortion on a continuous basis, alerts even a non-technical operator that a circuit is deteriorating. Thus pinpointed, the malfunction (a badly-tuned receiver in a radio link, for example) can often be corrected with little or no circuit downtime.

For detailed information on the TDMS, write for Bulletin RAD E-100B to Radiation Inc., Melbourne, Fla.

WHAT'S WRONG WITH THE SIGNAL SHOWN ABOVE? Character (letter R) shows a split 4th element, a result of poorly adjusted transmitting equipment. Spiral trace display on Telescan CRT (at left) indicates the presence, and analyzes the nature of characteristic distortion.

THE ELECTRONICS FIELD ALSO RELIES ON RADIATION FOR...

RADIPLEX–50-channel low-level multiplexer with broad data processing applications. Features rugged solid-state circuitry, almost unlimited programming flexibility, unique modular construction for compactness and exceptional ease of operation and maintenance.

RADICORDER–Multistylus recorder provides high-speed instantaneous readout for wide range of data acquisition or processing systems. Eliminates necessity of electronically translating complete data, thereby reduces computer work loads.

TELEMETRY TRANSMITTER–Model 3115 is a ruggedized 215-260 MC unit with extremely linear FM output under the most severe environmental conditions. With its record of outstanding performance in many missile programs, Model 3115 is specified by leading missile manufacturers.

RADIATION INCORPORATED

—WASHINGTON OBSERVATIONS—

By ROLAND DAVIES and FRED HENCK

Slash In Interstate Toll Rates Predicted

Telephone industry people in certain U. S. areas where the local newspapers carry the syndicated column of *Robert S. Allen* and *Paul Scott* were brought up short a few weeks back when they read a column stating flatly that interstate long distance telephone rates will be reduced by the Federal Communications Commission this summer.

The report — which was based on a considerable amount of fact but drew inferences and made predictions which we are not prepared to join at the moment — stemmed from an exchange of correspondence between FCC Chairman *Frederic W. Ford* and Chairman *Emanuel Celler* (D., N. Y.) of the House Judiciary Committee and its antitrust subcommittee.

Rep. Celler has been prodding the FCC about interstate telephone rates ever since his group held hearings two years ago on the 1956 Bell System-Justice Department antitrust consent decree.

Extracts From The FCC Letter

Rep. Celler's office made available to *Telecommunications Reports*, Washington correspondents for *Telephone Engineer & Management*, the full texts of the letters. They put matters in a somewhat different perspective and we recommend reading of the following extracts from the FCC letter to all concerned with telephone rates, and particularly those who saw the *Allen-Scott* column.

In his letter, Chairman Ford pointed out that "The Commission has had under active conisderation and study the interstate operating results of the Bell System for the year 1959 and the months of January and February, 1960. The available data, you will appreciate, reflect less than six months of operation under the reduced message toll telephone rates, which became effective Sept. 19, 1959, following the negotiations initiated by the Commission with the (American Telephone & Telegraph Co.)."

The Commission's view was expressed by Mr. Ford that "any definitive evaluation of the impact of the rate reduction on, and the current trends in, the annual level of interstate earnings should await the availability of additional monthly operating results. In this connection, it is to be noted that interstate operations for the five-month period of October through February generally reflect a higher level in relation to other periods of the year. Moreover, in another few months we will be in a better position to ascertain the status of the pending (National Association of Railroad & Utilities Commissioners)-FCC separation procedures, referred to below."

Mr. Ford pointed out that Rep. Celler's letter of Feb. 4 — "followed up" by another inquiry April 2 — "cited the level of earnings of 6½% that was calculated to result from the interstate long distance telephone rate increase which the Commission permitted in 1953; and you compare earnings in subsequent years to this earnings level. We should merely like to note that the 1953 rate increase was negotiated by the Commission with AT&T in the light of a complex of factors and circumstances pertaining to the interstate operations and revenue requirements of the Bell System as of that time.

"Within A Range of Resonableness"

"The level of earnings of 6½% was regarded by the Commission as being within a range of reasonableness and it does not necessarily follow, as your letter suggests, that it is representative of a maximum or ceiling rate

Next page, please

WASHINGTON OBSERVATIONS

(Concluded from page 35)

of return either for the period of that negotiation or for future periods. The Sept. 19, 1959, rate reduction was similarly negotiated on the basis of conditions as they existed six years later.

Interstate Schedules versus Instrastate Schedules

"One additional factor that is currently involved in the regulation of interstate long distance telephone rates and earnings is the disparity which exists between the interstate rate schedules and the rates for intrastate services for comparable distances which are subject to the jurisdiction of the several states. It has been urged by the various state commissions that this disparity is largely attributable to inequities in the so-called separation procedure.

"These procedures, which have been jointly developed over the years by the FCC and state commissions, are employed in the Bell System to allocate investment and expenses associated with telephone plant and property used in common to render both intrastate and interstate services.

"It is the feeling of the state commissions that the procedures do not produce a sufficient allocation of joint costs to the interstate services. Pursuant to a resolution adopted by the (NARUC) at its 1959 annual convention, further studies of the separation procedures are currently in progress.

"Should these studies culminate in revision of the procedures, thereby increasing the amount of Bell System investment and expenses assigned to the interstate jurisdiction, it could result in a material reduction in the level of interstate earnings as currently computed under the existing methods of separation."

Rep. Celler's Feb. 4 letter described his antitrust subcommittee as "very much concerned" with interstate telephone rates. He contended that by its 1953 rate action the FCC "obviously considered" a 6½% return "as the maximum necessary" to insure the financial integrity and safety of telephone plant. The New York Congressman declared that a rate reduction of $70,000,000 is required if the interstate return were to be reduced to 6½%, "as would seem to be required."

Washington News Notes

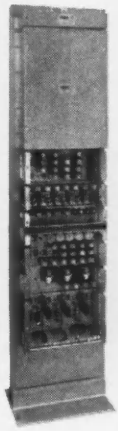
While two of the FCC-ordered hearing cases on tariffs filed by Independent telephone companies for service to air defense installations in their territories have been cancelled, the one involving the *California Water & Telephone Co.* is definitely going to hearing. California Water & Telephone counsel made this clear at a recent prehearing conference at the Commission, at which Sept. 21 was set as the date for the start of the hearings. Direct testimony is to be distributed in written form July 20.

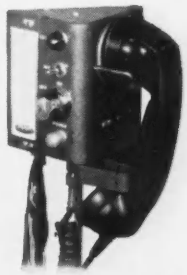
Outside of Washington, but of considerable interest here, the *General Telephone Co. of Ohio* has asked the *Ohio Public Utilities Commission* to reconsider its order giving the *Ohio Bell Telephone Co.* permission to make a mileage study of General of Ohio exchange circuit plant in connection with their toll compensation dispute.

Another FCC hearing on Independents' tariffs for service to air defense installations (see above) has been ordered on a tariff of the *Lincoln-Tillamook Telephone Co.*, Cloverdale, Ore. The General Services Administration had asked suspension of the tariff, but the FCC, while ordering the investigation, permitted the tariff to go into effect.—*Roland Davies and Fred Henck.*

Typical installation of General Electric mobile telephone instrument and control unit. You can boost the profits of your company with installations like this for your customers.

Dial exchange MTS instrument and control unit.





Manual MTS control unit.

Dial exchange MTS terminal.

Increase profits ❹ ways with G-E MOBILE TELEPHONES from Graybar

Your company can make extra profits on mobile telephone service. Your investment in equipment, for example, can be returned to you in only five years with as few as 50 subscribers.

Mobile telephone service already is working wonders in businesses such as trucking, cabbing, construction, highway maintenance, ranching and in numerous fields of public service.

Here are 4 packages of General Electric mobile telephone equipment that will turn investment into net profit for your company.

❶ **DIAL EXCHANGE MOBILE TELEPHONE SERVICE . . .** A service for telephone companies with automatic exchanges. All automatic terminals wired and equipped for 50 subscribers.

❷ **DIAL EXCHANGE MOBILE TELEPHONE SERVICE FOR AUTOMATIC BILLING . . .** A setup that features completely automatic identification for ticketing in addition to standard automatic mobile telephone service features.

❸ **MANUAL MOBILE TELEPHONE SERVICE FOR TELEPHONE COMPANIES USING OPERATORS TO HANDLE CALLS . . .** Gives a mobile telephone capability to your company with minimum additional cost. Mobile equipment is tied-in directly with your present switchboards like a standard telephone.

❹ **INTRA-SYSTEM SELECTIVE CALL . . .** A standard dial is provided in the vehicle as well as the station, and allows the user to call one, a group, or all mobiles on his system.

IMPORTANT PLUS . . . *General Electric mobiles and terminal all are compatible with Bell MTS systems.*

These up-to-the-minute General Electric mobile telephone systems are available from Graybar nationally. You'll find them representative of the wide selection of modern communications equipment we offer.

Write Graybar today for latest descriptive literature.

945

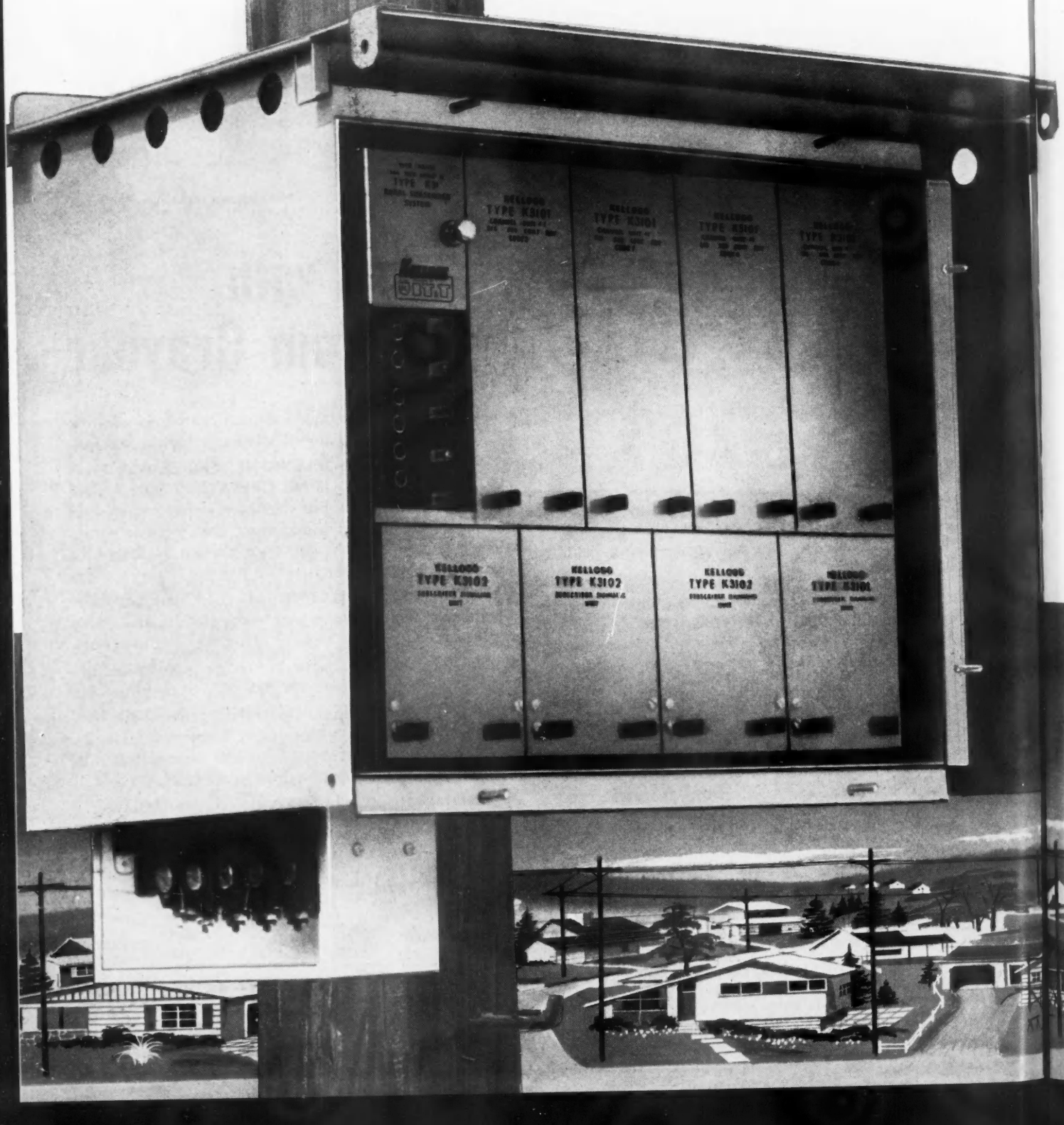
call **GraybaR** *first for*

Graybar Everything Electrical GraybaR Electric Company

IN OVER 130 PRINCIPAL CITIES

GRAYBAR ELECTRIC COMPANY, INC. • 420 LEXINGTON AVENUE, NEW YORK 17, N. Y.

Low cost answer to popu



pulation growth needs...

Kellogg Carrier

No industry knows better than America's independent telephone companies the strains that an explosive population growth can cause. Service demands tax existing facilities to the utmost and put many operating companies in a tight financial squeeze.

If you have put off a major cable expansion because of the need to conserve capital, then Kellogg Carrier is your answer. Here's why: low-cost Kellogg Carrier can add from one to eight additional rural lines on an existing wire!

The result of expert Kellogg-ITT research, both the K-31 Rural Subscriber Carrier and K-32 Open Wire Trunk Carrier have been rigorously field tested and are in active operating service throughout the country. Both Systems provide economical means to expand existing facilities without sacrificing toll standard quality.

And with Kellogg's *exclusive* repeaters, carrier system mileage can be doubled (using one repeater) . . . *tripled* with two repeaters . . . or *quadrupled* with three repeaters! You'll find, too, that Kellogg Carrier has more exclusive features and is priced lower than any other comparable system on the market.

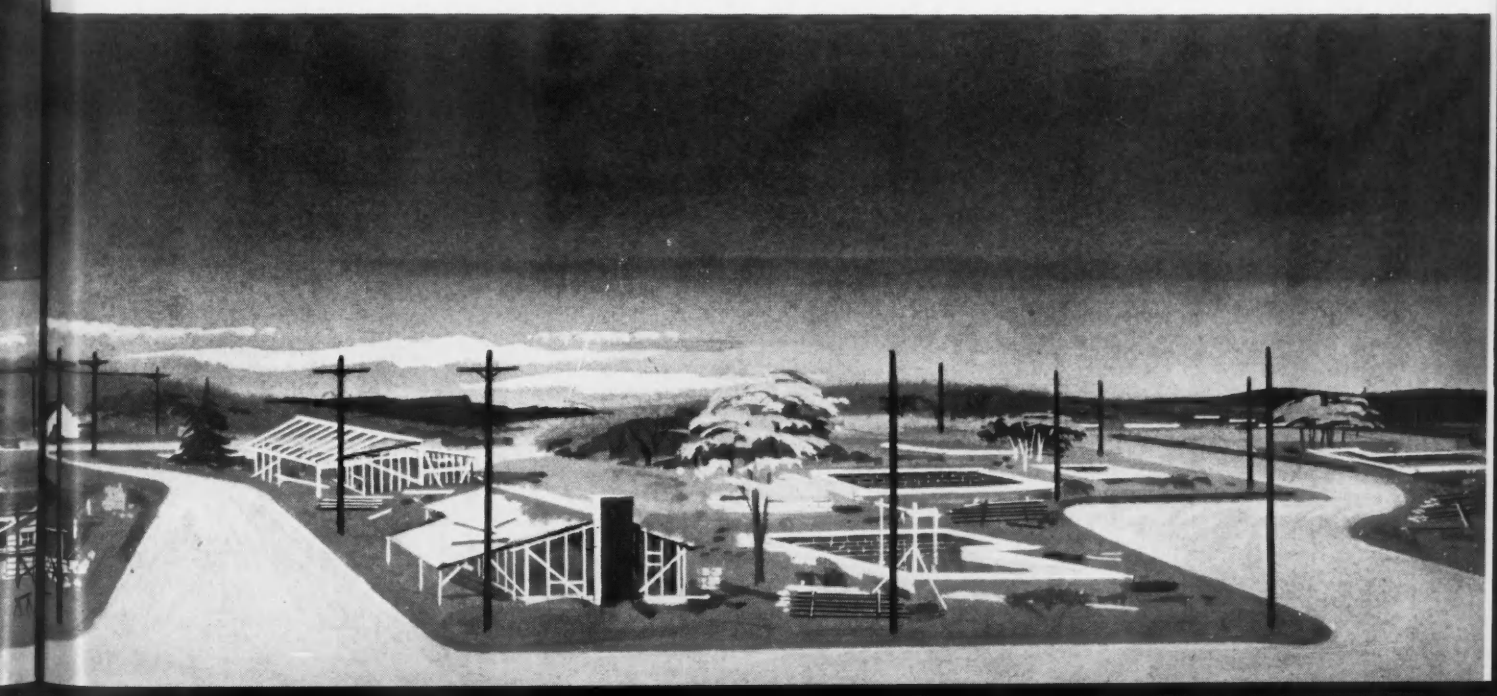
For complete technical details write Kellogg's Carrier Division at 2912 Wake Forest Road, Raleigh, North Carolina, or see your local Kellogg representative.

Kellogg Switchboard and Supply Company, 6650 South Cicero Avenue, Chicago 38, Ill.
Communications Division of International Telephone and Telegraph Corporation

Regional Offices and Warehouses:

CALIFORNIA: 23 Broderick Road, Burlingame, California, OXford 7-5780.
GEORGIA: 1594 Southland Circle, N.W., Atlanta 18, Ga., SYcamore 4-2441.
ILLINOIS: 4600 So. Tripp Ave., Chicago 32, Illinois, CLiffside 4-4300.
KANSAS: ..7th & Sunshine Road, Kansas City 15, Kansas, MAyfair 1-4418.
NEW YORK: 327 North West Street, Syracuse, N.Y., HArrison 2-9251.
TEXAS: 1359 Motor St., Dallas 7, Texas, RIverside 7-5191.
EXPORT: 4600 So. Tripp Ave., Chicago 32, Illinois, CLiffside 4-4300.

KELLOGG Communications Division of ITT
CHICAGO, ILLINOIS



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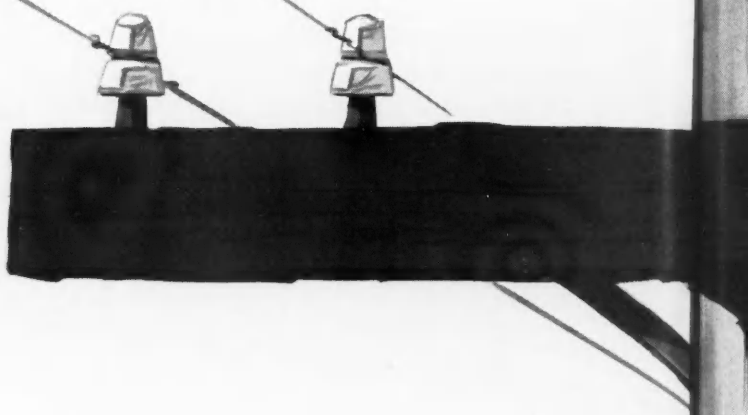

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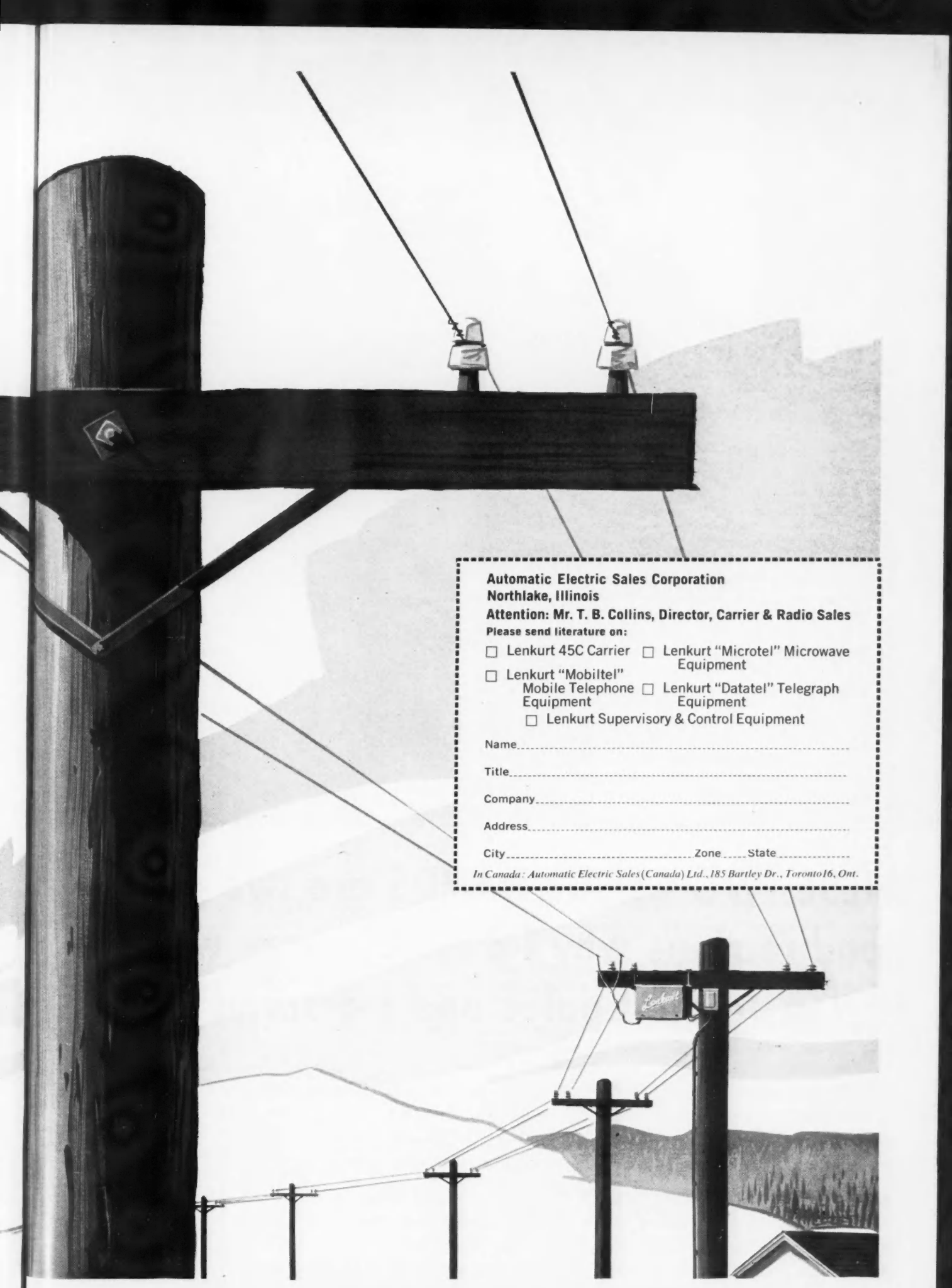

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EDITORIAL

"More Steam Is Needed"

SUPPORTERS of repeal or at least reduction of communications excise taxes found themselves at the beginning of this month in a familiar position — *weighted down under a stack of copies of the federal budget.* And anyone who has ever seen a copy of the budget knows it is weighty reading in more ways than one.

Despite the fact that the local telephone excise, under existing law, technically expires June 30, leaders in the telephone tax repeal drive knew at the outset of Congressional consideration that they were in for a tough battle. Main reasons for this were the Eisenhower administration's objection to cutting federal revenues at a time when it looked like Mr. Eisenhower might close out his Washington career with a big budget surplus, and the fact that many states were waiting in the wings to reimpose the local telephone tax in their own jurisdictions.

But it appears that among the many hopes blasted by the collapse of the Paris summit meeting, and the generally tense international situation, was the remaining possibility of telephone excise elimination. Added emphasis on defense spending, which was felt immediately after the Paris crisis, probably delivered the coup de grace to chances that the telephone tax would be allowed to expire quietly, at the federal level at least, on June 30.

It was a straight-out revenue argument which Treasury Secretary Robert B. Anderson and Budget Director Maurice H. Stans gave the House Ways & Means Committee when the annual tax extension bill came up for hearings.

Mr. Anderson pointed out that elimination of the local telephone tax, and reduction of the tax on transportation of persons to 5 per cent, as also programmed last year by Congress, would cost $455,000,000 a year in federal revenues.

Warning against tax-cut amendments, Mr. Anderson told the committee that "piecemeal tax reduction" would rule out hopes for the $4.2 billion budget surplus President Eisenhower foresaw for the 1961 fiscal year.

He also said such action would "tend to postpone" the day when Congress can consider more basic changes in the entire tax structure.

Budget Director Stans told the committee the Administration now expects to wind up the current fiscal year with a budget surplus about the same or "even slightly more" than the $200 million forecast by the President last January.

Such testimony appears to have ended the matter, as far as Ways & Means Committee was concerned. An effort to strike the telephone tax extension from the bill was defeated by a voice vote, without even the formality of a show of hands, let alone a nose-count. The same thing happened to a motion by Rep. A. Sydney Herlong, Jr. (D., Fla.) that the local telephone levy be reduced to 5 per cent.

House floor action had not been taken as this was written, but there appeared to be no practical possibility of any change in the situation. The revenue argument also was expected to be persuasive when the bill reaches the Senate Finance Committee. This leaves the Senate floor as the real remaining battleground for the telephone tax termination supporters.

Realistically, though, even if the Senate should approve such action, getting it past a joint House-Senate conference committee probably would make the Senate floor fight pale by comparison.

We do not believe the battle has been lost. However, it is clear that the tax repeal leaders are up against very considerable odds.

In fact, the present situation seems to prove the *Wall Street Journal* was correct when it recently reported — "*Helping the Administration along is the report from many lawmakers that not much steam is building up behind moves to allow the tax* [telephone and transportation] *to expire or be cut. . . .*"

If the *Wall Street Journal* comment is accurate, then it is certainly high time that some real "steam" be built up behind the programs aimed at convincing Congress it should eliminate the 10% tax on telephone service.

Without such "steam," June 30 may well find the telephone industry and its subscribers still saddled with a "*temporary, wartime tax*" that has taken another step toward becoming *permanent.*

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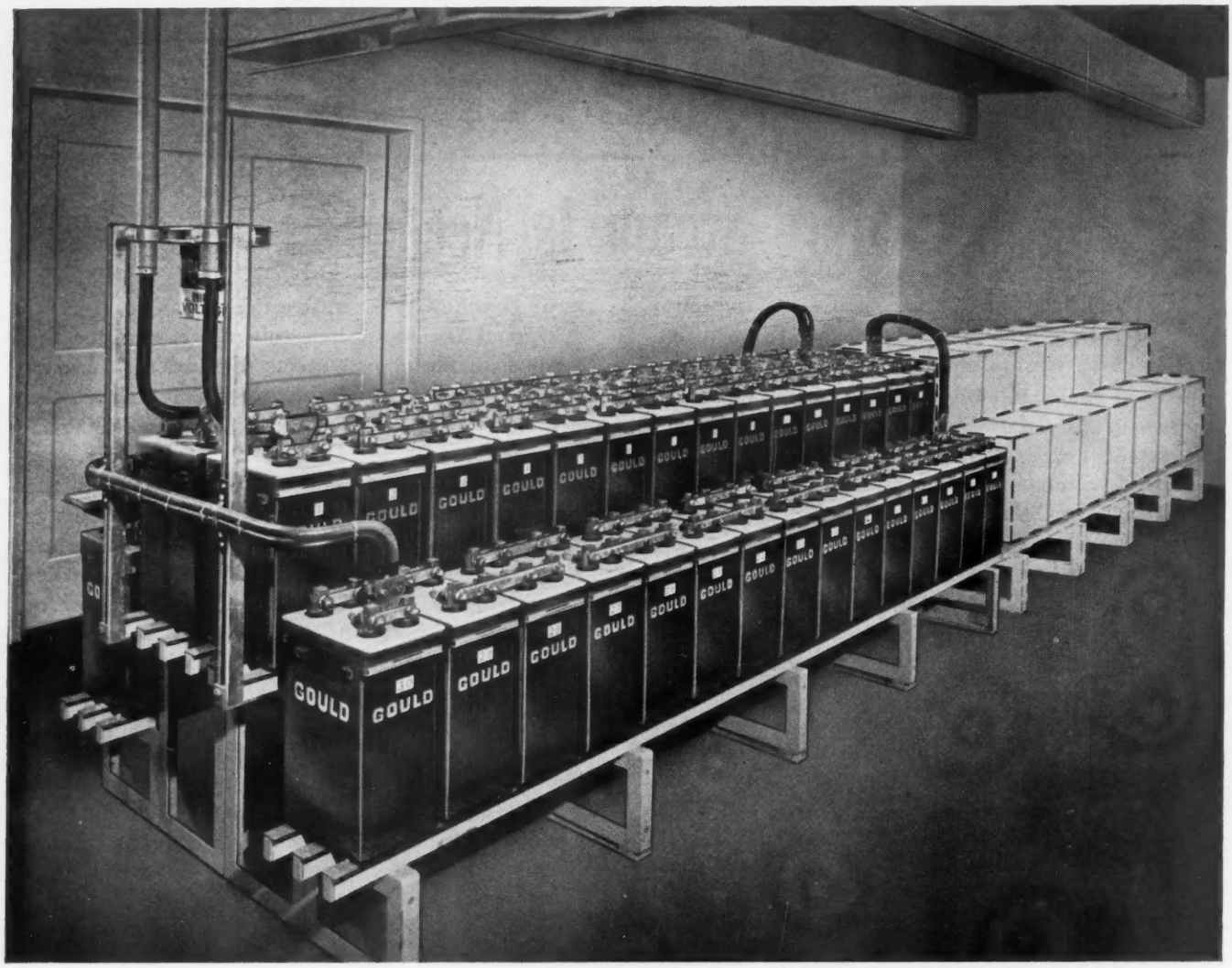

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These incidents, drawn more or less at random from a half-century of telephone memories, are factual; but in many cases names are omitted or disguised to avoid the possibility of annoyance to those concerned.

NOT ACCORDING TO SPEC....

BY L. A. GRITTEN

LIKE ALEXANDER the Great, when he surveyed the harem he had just captured from King Darius, I hardly know where to begin. This is intended to be a spontaneous eruption of experiences as they come to mind, not a cradle-to-grave chronology. But how does one start? Inspiration comes from television! As this is written, they are showing the great Montana blizzard of 1959. With a shiver, I recall my coldest experience in telephone work.

It was in Edmonton, Alberta in 1909. The city bore little resemblance to the quarter-million metropolis it has since become, but its winters were just as wintry. Clear, bright and invigorating, yes! But definitely cool at times. There was one week when the thermometer dropped down in the fifties every night — 56° below was the coldest — and it was no warmer than 40° below in the middle of the day.

As always in a very cold snap, we had lots of trouble from open fuses. They were of the wooden tube variety, with the fuse wire attached to metal tongues at each end. Not enough slack was left and around 40° below many of the wires contracted to the breaking point. Late one afternoon I was changing fuses in a terminal on Jasper Avenue, the main street. I was cold, stiff and not very happy. I finished the job slowly, with frozen fingers, and started to come down the pole. I failed to hang on and fell the last 20 feet, landing flat on my back on the sidewalk.

It was one of those miracle falls. With a nice cushion of crusted snow under me, I found to my amazement that nothing was broken; the only thing wrong with me was cold, cold, cold. According to the bedtime stories, in Switzerland on such occasions a big St. Bernard dog ambles up with a little cask of cordial. In Edmonton it was even better. A friend saw me and hailed me into his office. He sold wines and spirits at wholesale and generally had a sample or two in his desk.

He handed me a big glass full of something red and said: "Put that down — and don't climb any more poles today."

He explained: "It's Ontario wine and Scotch whiskey. Haven't any brandy."

Only a savage mixes wine and whiskey; it tasted

Next page please

vile; but it was the Nectar of the Gods. I thawed out and finished my day's work in style.

Sitting Down On The Job

THE COLD muse switches me to Gresham, Oregon in January, 1940. Gresham lies a few miles to the east of Portland, in the Columbia River valley. Its exchange area, operated by the *West Coast Telephone Company*, is a lovely country for nine or 10 months in the year, a land of farms and trees and streams and flowers, with majestic Mount Hood for its background. In the winter, it can occasionally be less than delightful, especially to a telephone man.

The Gresham area is noted for its "Silver Thaws." They may be described as a vicious and rapidly recurring cycle of freeze-snow-rain, usually accompanied by strong winds. On open leads they are devastating. The wires become heavy with snow. Then a thaw, just a degree or two above freezing. More rain. Another freeze. More snow. And so on and on. Every wire becomes a rod of ice as thick as a man's wrist. If the wires are old and tired, down they come. If they are young and strong, down come the poles. And how they came down in the Gresham area that week!

It was our record storm. It started with a heavy fall of snow. Then the thaw-rain-freeze-snow cycle turned every highway into a skating rink. A howling gale from the east added to our misery. The Columbia River gorge recalled Shackleton's description of an Antarctic blizzard. Wires like gargantuan icicles were down everywhere. We counted our fallen poles by the mile or the hundred; and they fell with such force that crossarms were splintered in pieces on the frozen roads; bolts and braces were twisted and broken. The storm persisted without mercy. Three days after it started, poles were still falling — and two weeks later most of those that still were standing could not be climbed owing to ice.

It was too much, far too much, for our district force. I called our head office in Everett, Washington, 220 miles to the north, and howled for help. Crews were rushed in from other districts. Every tragedy must have some comic relief and this was furnished by the heavy gang that came from Everett. It was run by *Troy Bales;* and they could not have sent us a better man.

Troy had never been in Oregon and he welcomed the diversion; but his first footfall in that fair state was an event that he has never been allowed to forget. Where he stopped his truck, near Gresham, the road was a sheet of ice, on a sharp slope. Troy stepped out. He sat down, but not from fatigue. He moved, but not according to plan. Eventually he stopped, but not soon. Opinions vary as to how far he actually travelled on his derriere. Some reports ran as high as half a mile, but Troy insists that it was not much over a block. At all events, it was a good first impression.

A cold snap in Everett, one winter in the 'twenties, caused what we believed to be a unique case of cable trouble. Every wire in a 25-pair lead-covered cable went open. The test desk gave a location to *"Doc" O'Neill*, our cable splicer. In due course, Doc called in: "You fellows have missed your guess. Every foot of that cable along there is in plain sight and there is no break."

Another test verified the location, so Doc rode the cable with his tone test. He found that one span had been pulled in much too tight. Contraction due to the sudden cold had broken every wire in the cable at one point; but the soft lead sheath had merely stretched, leaving the cable apparently undamaged.

A Selective Cable

THE MOST fantastic telephone cable that I ever heard of was installed by *Charles E. Wells*. He was one of the "stalwarts" in the early days of the Independent telephone industry. He owned and operated telephone companies, and worked in every phase of the game, far back in the days of Blake transmitters and bitter hatred of anything bearing the Bell insigne.

Wells was one of the founders of the Oregon Independent Telephone Association; and he was its president for many years, until his death in 1942. He delighted to tell the story of the time he had to serve a newly developing area in a middle western city.

It was located some distance away from his exchange, in a railroad area where cable was essential. He lacked money to buy the cable; but Charlie was never lacking in resourceful expedients. He picked up many thousands of feet of junked duplex drop-wire. He spliced it up, taped the bad spots and laced it into a huge cable.

He called it his "selective cable" because, he explained, "When you rang out on any pair in it, every bell rang and everyone answered. All you had to do was select the fellow you wanted to talk to, and tell the rest to hang up." Things have changed since then!

Prophets Without Profit

THE GREATEST change in our business since its inception 80 years ago has been due, of course, to radio-telephony. One day in 1910 I was working on the main frame in the Seymour exchange in Vancouver, B. C. A convention of some sort was in progress and a group of important engineers from all over the U.S.A. and Canada was inspecting our plant.

I listened eagerly to the pearls of wisdom that fell from their lips. Briefly they discussed radio-telephony. Without a dissentient voice, they agreed that while it was an interesting laboratory experiment, never in their time could it become of practical use or commercial value. They were very certain about that. I have often wondered if any of them remember — and blush for — their predictions.

A decade or so later, when I went to work in Seattle, the radio craze was in its first bloom. Everyone was making radio sets and arguing about the relative merits of different types of crystals. Coils were wound on anything from beer bottles to Quaker Oat cartons, with any sort of wire that could be bought, borrowed or stolen.

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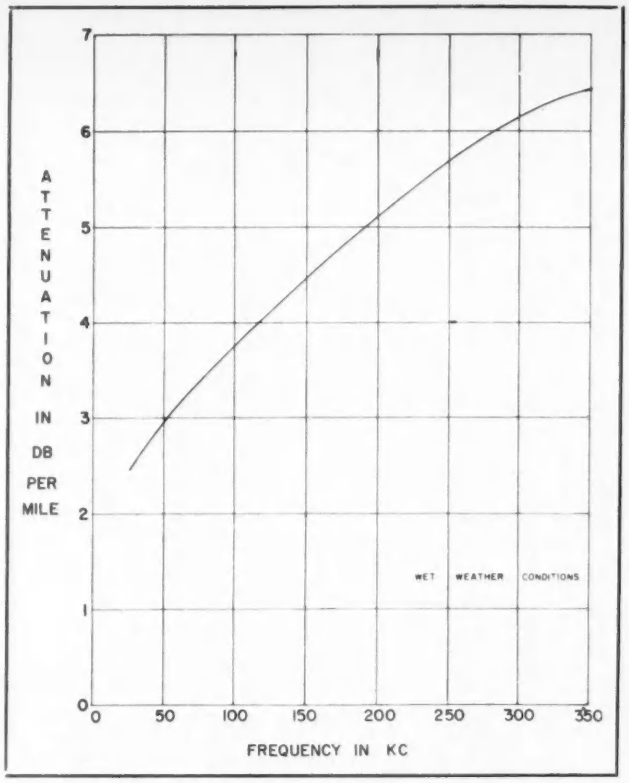

FIGURE SIX: — Chart of attenuation on open-wire line with steel conductors of all gauges. (Panhandle Electric.)

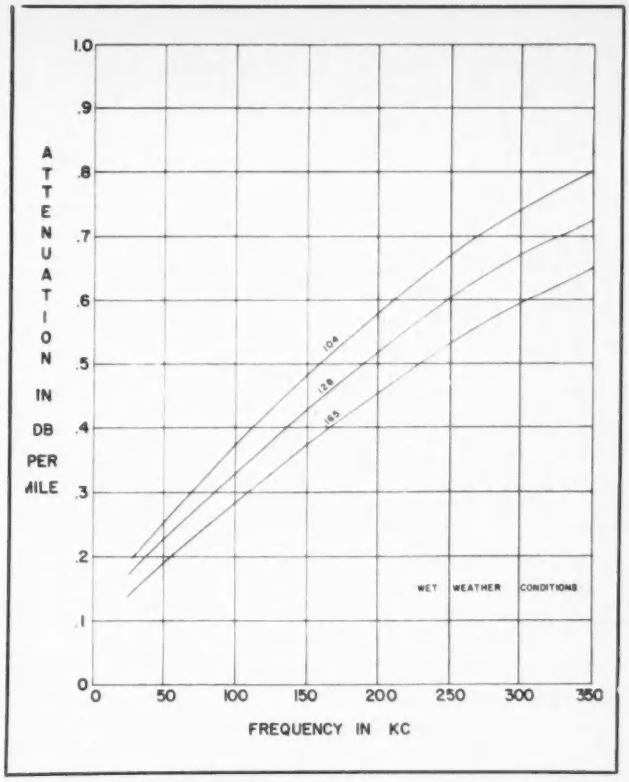

FIGURE SEVEN: — Chart of attenuation on open-wire line with copper conductors of indicated gauges.

An Efficient Cost Cutter—

The Subscriber Carrier System

By JOHN S. REED

Chapter Three of Mr. Reed's article discusses (1) the analysis of physical facilities for subscriber's carrier (2) use of transmission measurements to check calculations; and (3) line conditions affecting subscriber carrier operations. (Chapter Two of this article appeared in the 9-15-59 TE&M.)

Analysis of Physical Facilities For Subscriber's Carrier

AN IMPORTANT step in establishing a subscriber's carrier system is the analysis of the physical facilities to be used for transmitting the carrier frequency bands. This analysis will show if the existing or proposed physical facilities will meet the line loss limitations. This loss varies with the type and make of carrier equipment, ranging from 25 to 36 db under dry weather conditions, and is determined at the highest frequency to be transmitted over the facilities.

The factors to be considered in the analysis are the length, gauge, and type of cable containing the pairs used for the subscriber carrier channels, and the length, size, and kind of open wire conductors transmitting the carrier. In addition, when the open wire lead includes a number of lines besides the carrier circuit or circuits, the transposition scheme used for the lead and the power exposure (joint or line parallel) needs to be determined.

The choice of pin positions for the carrier circuits is important, particularly when more than one carrier physical is involved, whether operating from equipment of the same or a different make. The presence of the subscriber carrier in the same lead with toll carrier circuits causes crosstalk difficulties and may require expensive retransposing of the line wires to eliminate

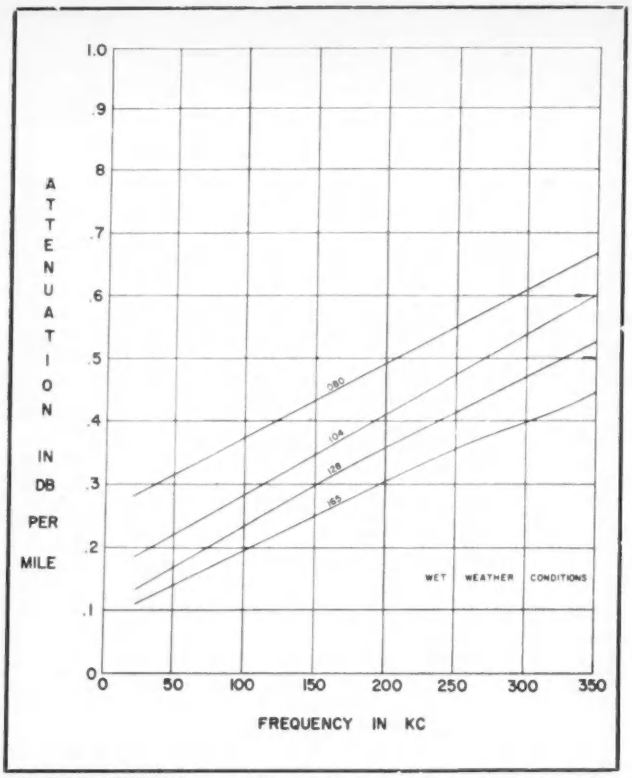

FIGURE EIGHT: — Chart of attenuation on open-wire line with copper-steel conductors (40% conductivity).

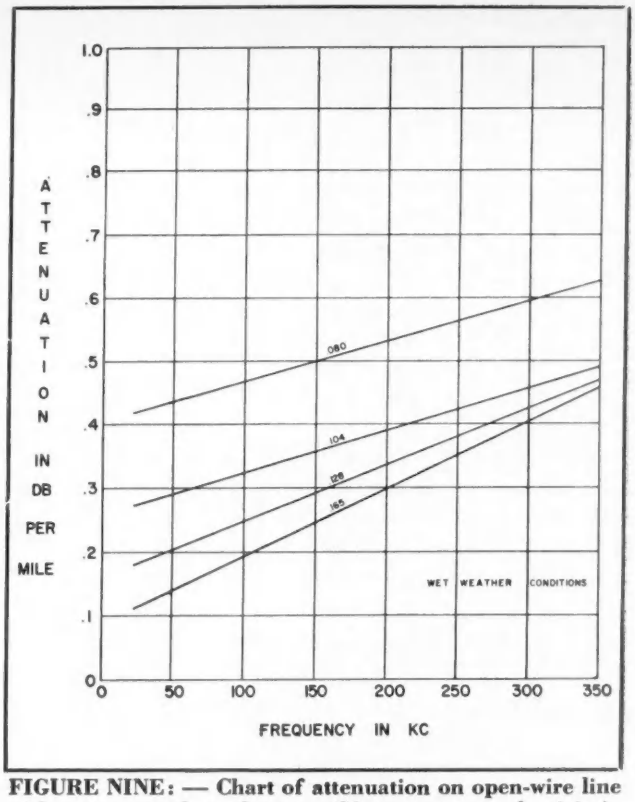

FIGURE NINE: — Chart of attenuation on open-wire line with copper-steel conductors (30 per cent conductivity).

the interference, particularly in high frequency carrier systems.

The maximum loop resistance of the subscriber lines to be connected to the subscriber terminal is also required. This varies from 390 to 1500 ohms, depending on the type and make of the carrier equipment, and may or may not include the resistance of the telephone instrument.

In making line loss estimates, the attenuation of the open wire and cable portions from the central office to the subscriber carrier terminals has to be determined. The manufacturers furnish tables or charts which indicate attentuation values for various types of line facilities, the values being given in decibels per mile at the indicated frequencies. These are average wet-weather values. *Figure Six* to *Ten* illustrate typical charts used for a carrier frequency range of up to 350,000 and 500,000 cycles. *Figure* 11 shows a simplified table provided by one manufacturer for the carrier frequencies used in his equipment.

Taking the channel frequencies in the design, computations are made of the loss for each section of the physical facility. The resulting figures are added to give the total loss for each channel, plus 3 db for the loss at the junction of cable to open wire. The total calculated line loss for each channel should not exceed the limit specified by the manufacturer of the equipment.

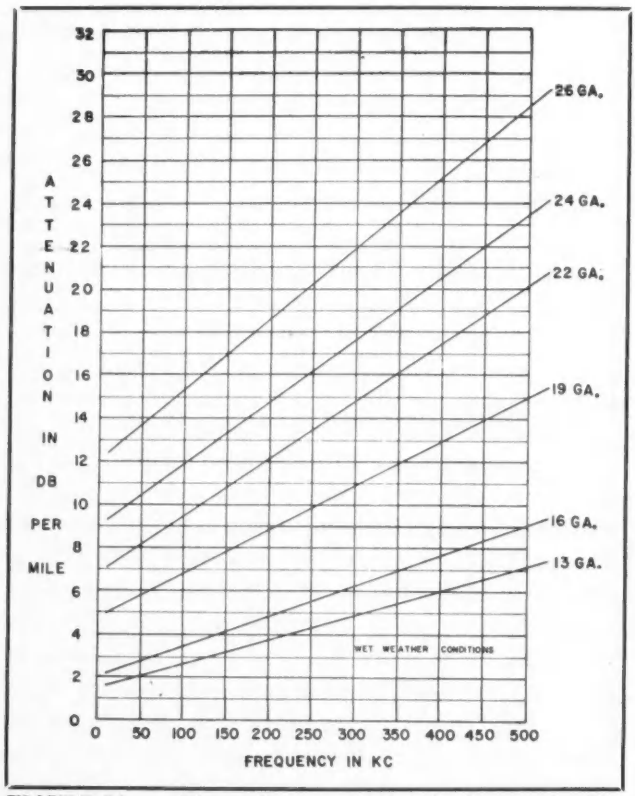

FIGURE 10: — Chart of attenuation on lead-covered cable with paper insulated conductors of indicated gauges.

Transmission Measurements To Check Analysis

TRANSMISSION measurements are important to verify the calculations and detect hidden line losses resulting from faulty conditions. The method varies somewhat with the type and make of equipment. The following is a typical procedure for a frequency modulated subscriber carrier system with a range of 350,000 cycles.

The tests are made at 5000 cycle intervals over the range from 5 kc to 350 kc, with care being taken to detect loss notches or dips that could affect one or more channels. The test equipment consists of an oscillator with an

CARRIER FREQUENCY ATTENUATION IN DB/MILE BY CHANNELS

CIRCUIT COMPOSITION	GAUGE	CAP. MFD/ MILE	1000 CPS ATTEN DB	BUDELMAN TYPE 34A - PLC 1 24 KC	2 48 KC	3 72 KC	4 96 KC	BUDELMAN TYPE NUMBERS 16B - 37A - 38A - 39A 1 20 KC	2 40 KC	3 60 KC	4 80 KC	5 100 KC	6 120 KC	7 140 KC
CABLE — Lead-paper	26	.079	2.9	11.8	15.4	16.6	17.8	11.0	15.0	16.0	17.0	18.0	18.5	19.0
	24	.084	2.3	9.3	11.4	12.6	13.8	8.9	11.0	12.0	13.0	14.0	15.0	16.0
	22	.082	1.8	6.4	7.6	8.6	9.3	6.2	7.3	8.1	8.9	9.4	10.0	11.3
	19	.084	1.3	4.0	4.8	5.7	6.3	3.8	4.6	5.2	6.0	6.4	7.0	7.5
	19	.066	1.1	3.2	3.9	4.5	5.0	3.1	3.7	4.2	4.7	5.1	5.4	6.0
	16	----	0.7	2.0	2.6	3.2	3.6	1.9	2.4	2.9	3.3	3.7	4.1	4.5
Plastic (Polyethylene)	22	.085	1.8	5.7	6.6	7.0	7.3	5.5	6.4	6.8	7.1	7.4	----	----
	19	.090	1.3	4.1	4.6	5.1	5.6	4.0	4.4	4.8	5.3	5.7	----	----
	19	.066	---	2.9	3.4	3.9	4.3	2.8	3.3	3.6	4.0	4.4	4.8	5.2
OPEN WIRE — Copperweld 30%	.080	----	.26	.41	.43	.45	.47	.41	.44	.45	.47	.48	.49	51
	.104	----	.19	.29	.32	.34	.37	.28	.31	.33	.35	.37	.39	.41
	.128	----	.14	.21	.24	.26	.29	.20	.23	.25	.27	.29	.31	.34
Copperweld 40%	.080	----	.22	.33	.36	.39	.42	32	.35	.37	.40	.42	.45	.48
	.104	----	.15	.22	.25	.28	.32	.21	.24	.27	.29	.32	.35	.38
	.128	----	.11	16	.20	.23	.27	.16	19	21	.25	.28	.31	.34
Copper	.104	----	.07	17	.25	.31	.37	.16	.23	.28	.33	.38	.42	.47
	.128	----	.05	.14	.20	.25	.30	.13	.19	.23	.27	.31	.34	.38
	.165	----	.04	.11	.17	.21	.26	.11	.16	.20	.23	.26	.30	.33
Galvanized Steel (zinc half gone)	.109	----	.31	1.75	2.43	3.10	3.78	1.63	2.20	2.76	3.33	3.89	4.18	4.47
Multi-pair Dist. wire (6 pair)	19	----	1.4	2.72	4.00	5.26	6.58	2.5	3.6	4.6	5.7	6.8	7.6	8.5

FIGURE 11: — Attenuation table for specific carrier frequencies. (Budelman Electronics Corporation)

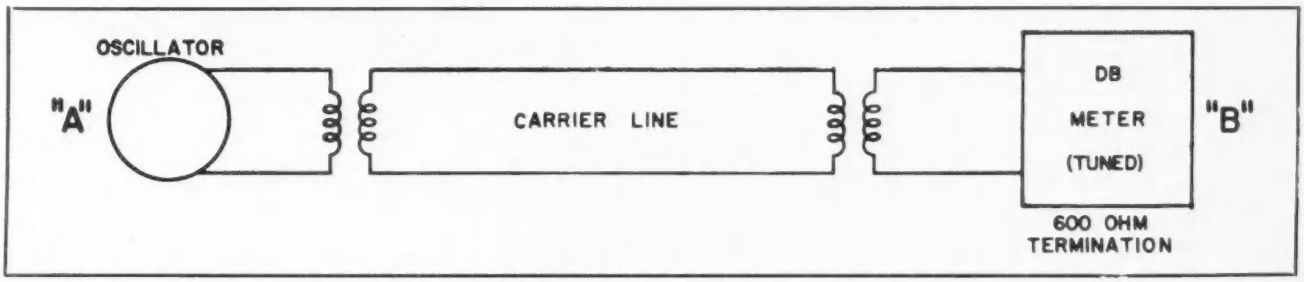

FIGURE 12: — Arrangement for measuring attenuation on a carrier physical line. (Panhandle Electric Sales, Inc.)

output level of minimum —20 dbm and a range of 5 kc to 350 kc, a frequency-selective voltmeter, or tuned decibel meter, which reads from —30 dbm to —50 dbm, matching transformers that will pass the carrier frequencies measured without attenuating them. With the connection as shown in *Figure* 12, the oscillator A is set to the frequency to be measured and, by sending from oscillator A at a known level, usually — 20 dbm, the line loss can be measured at the meter B.

The carrier line is connected as shown in *Figure* 12. All drops and spur lines are disconnected from the line. No impedance matching is employed at junctions of cable with open wire, since any existing repeating coil used for this purpose may not be capable of passing the carrier frequencies without excessive loss.

It is desirable to go over the proposed carrier line and correct any faulty physical conditions such as bad splices and connections, cracked or missing line insulators, dirty or pitted protector blocks, and fuses with loose fuse link. In other words, the line should be in good condition from a maintenance standpoint, keeping in mind that currents of carrier frequencies are much more easily affected by poor line conditions than voice frequency currents.

When there will be a number of carrier channels on separate physical circuits in an open wire lead, crosstalk effects will have to be taken into consideration, particularly when a frequency modulated system, which operates in the higher frequency ranges, is involved. When

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Electronic Communications

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Tiros Weather Information Satellite in Orbit

TELEVISION weather satellite which gives about an 850-mile square view of the weather picture, recently launched as part of the National Aeronautics and Space Administration Program is now orbiting the earth.

Two television cameras to photograph the earth's changing cloud cover patterns are mounted in NASA's TIROS (Television Infra-Red Observation Satellite) developed by Radio Corporation of America for the U. S. Army Signal Corps. (The Signal Corps developed the first and earlier weather satellite, VANGUARD II, which was launched February 17, 1959.) The large area TV camera is augmented by the second camera which pinpoints smaller sections of cloud cover. Both provide meteorologists with detailed pictures of hurricanes and cyclonic patterns. The resolution is roughly comparable to commercial televisions and may even show individual cloud types, tornado breeders and thunderstorms.

Mosaics made up of a number of TIROS photographs should aid meteorologists in making more accurate long-range and immediate weather forecasts, and provide more visual data than was available before.

The information gathered by the TV cameras in individual photographs is stored on magnetic tape in the satellite and then fed, on radio command, to ground stations. There are two basic ground stations, one at Fort Monmouth, New Jersey, operated by the Army Signal Corps, and the other at Keana Point, Hawaii, operated by Lockheed Missile and Space Division and its consultant, Philco Corporation, under contract to the Air Force Ballistic Missile Division. Back-up stations are at Highstown, New Jersey, and Cape Canaveral, Florida.

These stations can order photographs three orbits in advance, when the satellite's position and the sun combine for the best picture possibilities. Ground stations can take their own pictures. When the satellite is in range, it can be commanded to transmit the TV picture of the moment directly to earth, without being taped.

Project TIROS, a weather satellite experiment conducted under the direction of the National Aeronautics and Space Administration, illustrates the U. S. Army Signal Corps' continuing efforts in meteorology and support of national space projects. In this photo the array of 9,200 solar cells covering the top and sides of the satellite are examined by Herbert Butler, center, project manager for the U. S. Army Signal Research and Development Laboratory, and Abraham Schnapf, left, and Barton Kreuzer, right, of RCA Astro-Electronic Products Division. (U. S. Army photograph.)

Cloud cover pictures are recorded at both basic ground stations on film and magnetic tape. Original films are transmitted at once to Washington for analysis, while duplicates and the tapes, which can be converted to photos, are processed at the sites.

TIROS, shaped like a round pillbox (see illustration), is 42 inches in diameter and 19 inches high. It is spin-stabilized in space, like a gyroscope, so that its bottom surface faces the earth during only part of its orbit. The TV cameras, as well as four transmitting antennas, are mounted on the bottom, or base plate. A receiving

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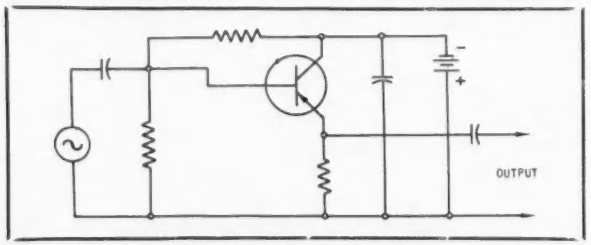
ELECTRONICS NOTEBOOK

By LEO G. SANDS

6.2-3 COMMON COLLECTOR AMPLIFIER

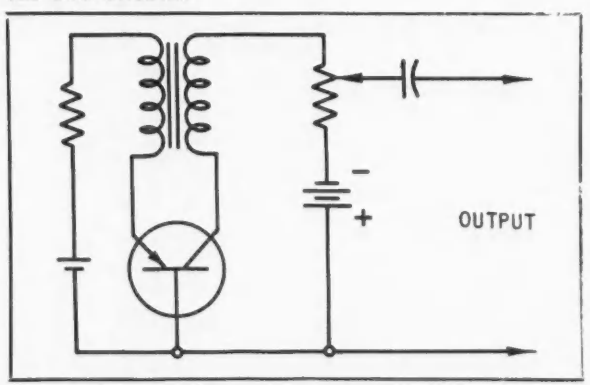
In the common collector PNP amplifier, the collector is at ground potential as far as the signal is



concerned. Input impedance is 50,000 ohms or more; output impedance is 100 ohms or less. Voltage gain is less than one but power gain is about 15.

6.2-4 TRANSISTOR OSCILLATOR

A transistor oscillator functions in a manner similar to a tube oscillator. Note the similarity between the two circuits.



Part Six — June 1, 1960

6-2-3 — TRANSISTORS

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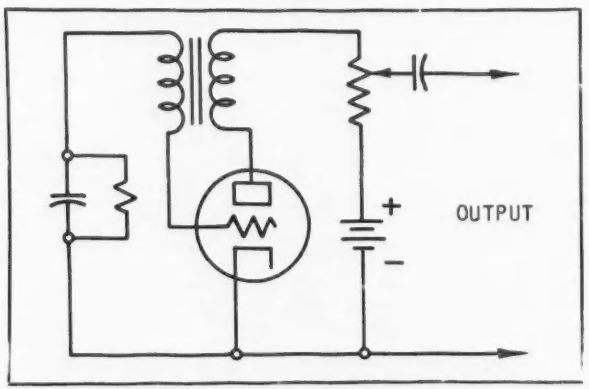
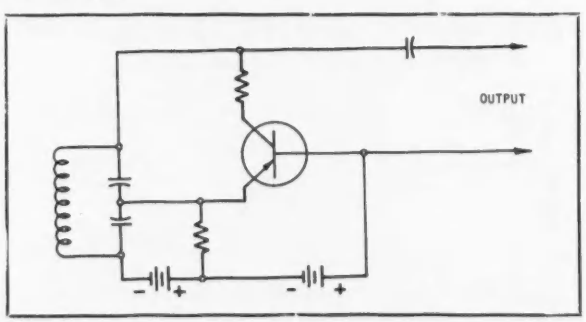


6.2-5 COLPITTS OSCILLATOR

Here a transistor is shown in a Colpitts oscillator circuit which is not much different from its tube counterpart.



6.2-6 HARTLEY OSCILLATOR

Here a transistor is shown in a Hartley oscillator

Part Six — June 1, 1960

6-2-4 — TRANSISTORS

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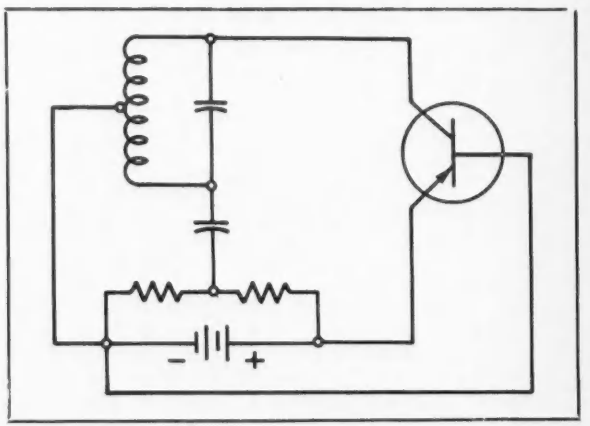


circuit, again not too different from a tube-type Hartley oscillator.

The "Electronics Notebook" is a regular feature of "Telephone Engineer & Management." We urge all readers to read and file these informative 'Spec' book sheets for future reference. If you missed previously published sections of "Electronics Notebook" write TE&M for tear sheets.

Part Six — June 1, 1960

6-2-5 — TRANSISTORS

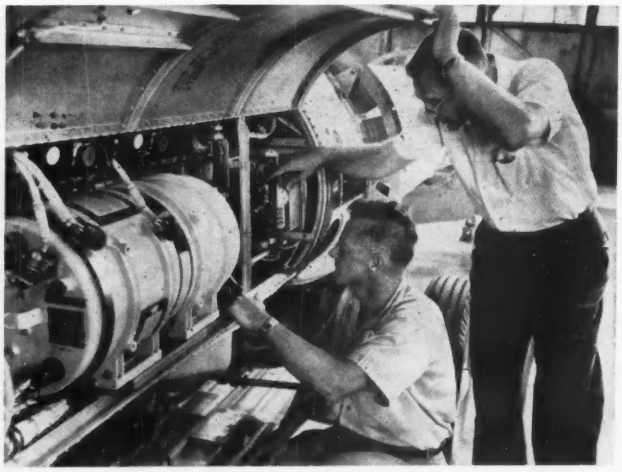
More Data For Your "Electronics Notebook" In The Next Issue.

Electronic Communications

(Concluded from page 50)

antenna projects from the top surface. Electrical power for the satellite is provided by banks of solar cells. They operate directly when the vehicle is in the sun and also charge lightweight storage batteries for power when it is in the earth's shadow.

The TIROS was directed into its 400-mile circular orbit with a Bell Telephone Laboratories Command Guidance System using a Thor Able missile to launch the satellite (see photo). Preliminary tracking data



At Cape Canaveral, Florida, two Bell Telephone Laboratories engineers, T. J. Grieser and D. R. Hagner, look over the second-stage of the Air Force THOR ABLE missile used to launch the NASA TIROS I weather satellite. A Command Guidance System by Bell Laboratories and Western Electric Company guides the TIROS satellite into a preselected circular orbit.

indicates that the National Aeronautics and Space Administration's weather satellite is closely following its preselected orbital path around the earth.

This radio-inertial command guidance is the same system developed by Bell Telephone Laboratories and Western Electric Company for the Air Force Ballistic Missile Division for use in the first squadrons of the TITAN intercontinental ballistic missile.

In this command guidance system, ground-based radar continuously determines the position of the missile during powered flight. A Remington Rand-Univac digital computer, developed for the guidance system, is also on the ground. The computer accepts these data and, by reference to previously stored trajectory information for the particular mission, computes appropriate orders to steer the missile on its proper flight path. These corrective orders are transmitted by radio to the missile and are applied to the missile's autopilot and control system.

The principal guidance control equipment, such as the radar and computer, is kept on the ground, to be used over and over again for firing ICBM's or launching space vehicles. The units of the guidance placed in the missile itself are kept to a minimum to promote reliability in an environment that is far more rugged than that on the ground.

Among the advantages in this command guidance system is that it permits a reduction in cost and weight of airborne equipment. Each pound of weight in the second stage and in the "payload" or satellite requires hundreds of pounds of fuel to launch it. A reduction in weight of the guidance system means additional instrumentation can be placed inside the satellite without requiring a greater amount of fuel for launching.

Laboratory Ship "Fantastic" Built on New Jersey Hilltop

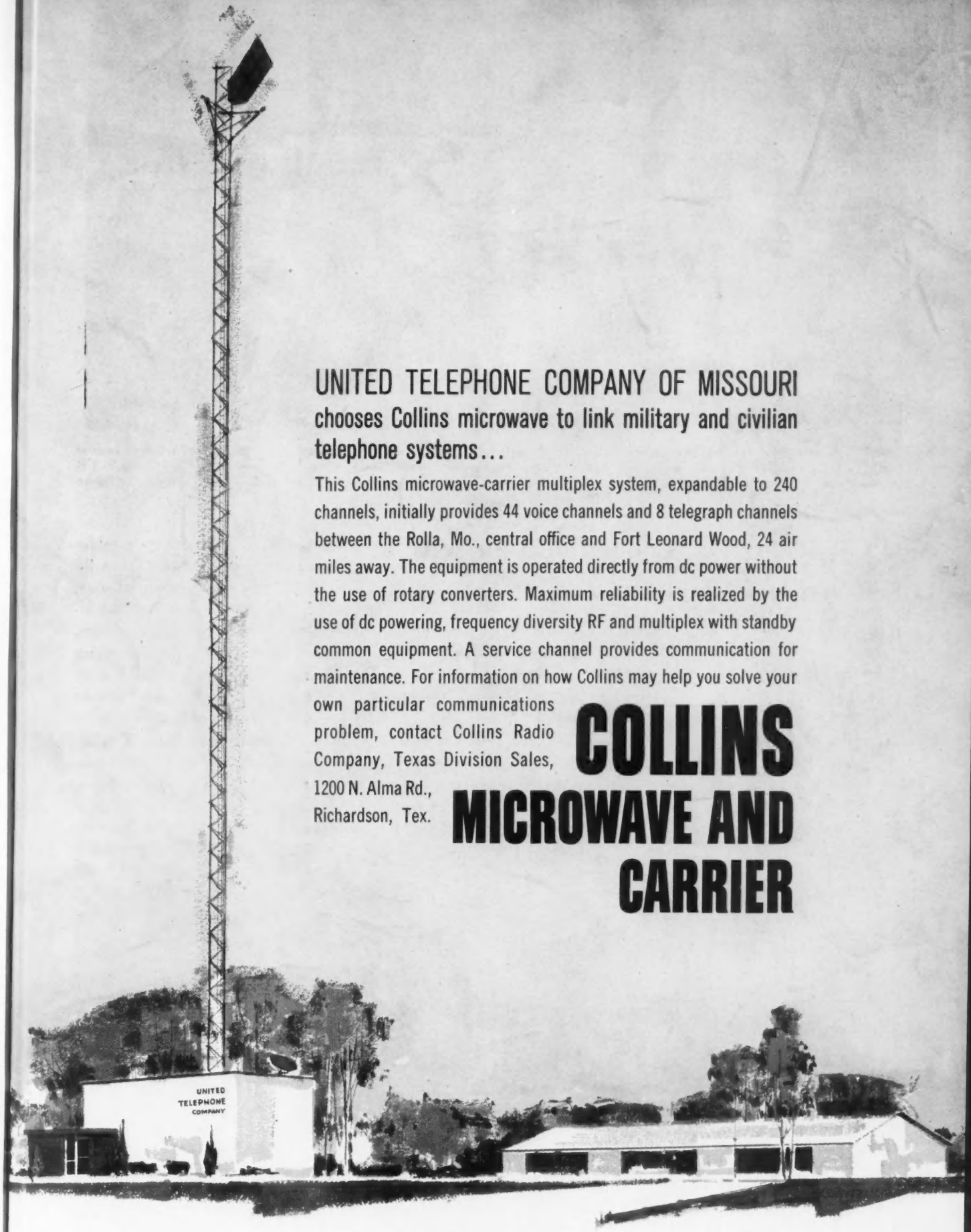
TWENTY-EIGHT miles inland from ship lanes, a "cable ship" has been located on a hilltop near Chester, N. J. It is a mockup of the cable tanks and working decks of an actual cable-laying vessel. The structure stands 50 feet high and extends 200 feet from stem to stern. The model ship is designed to help Bell Telephone Laboratories engineers carry out the most extensive modernization of cable ship equipment and techniques since the first telegraph cables were laid a century ago. These changes are needed to enable improved types of telephone cables to be properly handled in laying them under water.

The mockup will enable engineers to simulate deck layouts and cable handling operations of cable ships. During cable-laying experiments, a winch pulls the cable out of the cable tank, down hill and around a sheave, simulating the cable being pulled into the sea by gravity.

Underwater cables recently laid in the oceans have electronic repeaters, or amplifiers, spaced about 38 nautical miles apart, which are flexible and thus handled like cable when laid in the sea. To transmit more conversations in a proposed new cable system, however, it is now planned to use rigid, metal-encased repeaters, three feet long and one foot in diameter.

These rigid repeaters must be paid out with the cable, preferably through a cable engine and over whatever surfaces the cable must pass. Moreover, payout should be continuous, reliable, and at reasonably high speed. To achieve this, a technical revolution in shipboard machinery and techniques is being brought about.

Construction of a life-size mockup was found to be more practicable and economical than chartering a cable ship for the long periods necessary. Many of the needed experiments could not be readily performed nor adequately observed aboard a real ship at sea. The skeletonized *Fantastic* enables engineers to watch their experiments and to obtain motion-picture records for detailed study.



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This Collins microwave-carrier multiplex system, expandable to 240 channels, initially provides 44 voice channels and 8 telegraph channels between the Rolla, Mo., central office and Fort Leonard Wood, 24 air miles away. The equipment is operated directly from dc power without the use of rotary converters. Maximum reliability is realized by the use of dc powering, frequency diversity RF and multiplex with standby common equipment. A service channel provides communication for maintenance. For information on how Collins may help you solve your own particular communications problem, contact Collins Radio Company, Texas Division Sales, 1200 N. Alma Rd., Richardson, Tex.

COLLINS MICROWAVE AND CARRIER

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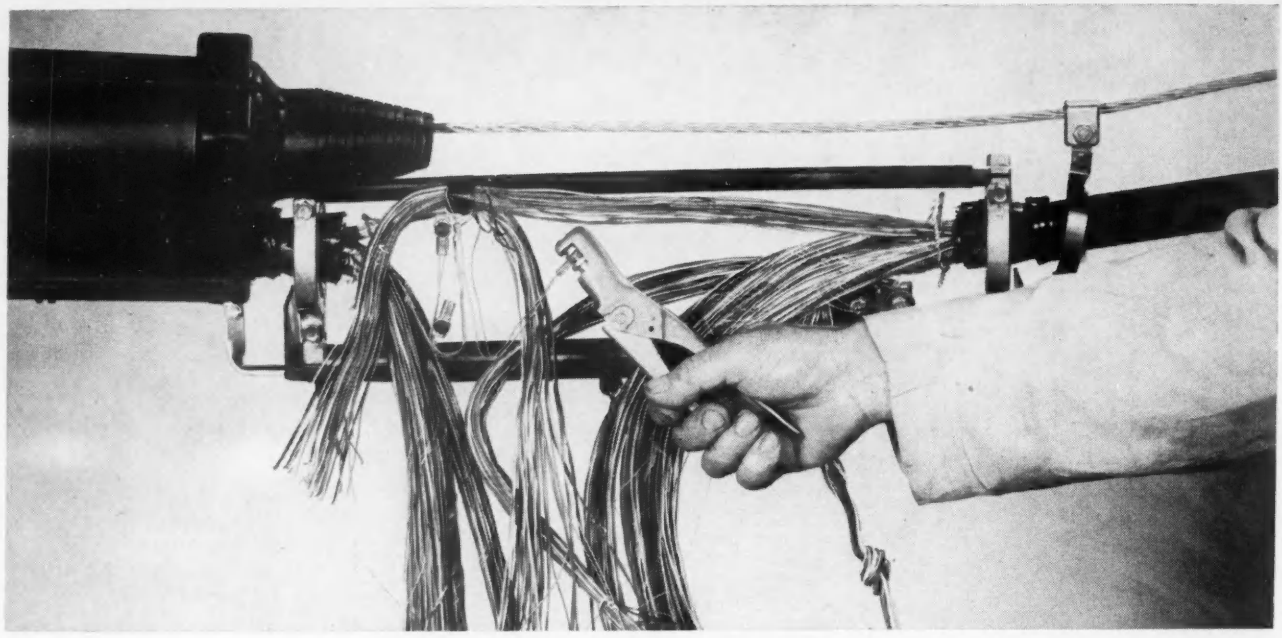


With both ends of first binder group of coded wires taped to back side of the support rod, the splicer begins matching and splicing. First step is to cut wires to length; next, insert wires into barrel of the "Scotchlok" UR connector, then squeeze button into connector, completing the splice. No stripping of wires is necessary, saving 30 to 50 percent of splicer's time.

New Connector For Communication Wire Is Self-Stripping And Moisture Proof

By E. E. LEACH*

A SELF-STRIPPING communication wire connector, the first ever developed for the telephone, communications and signaling industries, has been announced by Minnesota Mining & Manufacturing Co. (3M).

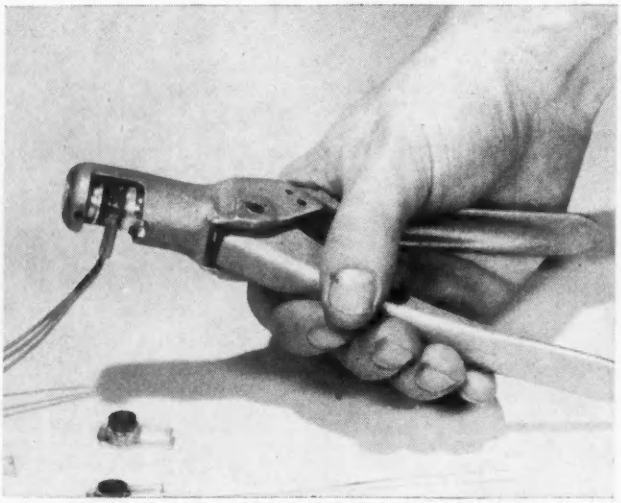
Also self-sealing and pre-insulated, the "Scotchlok" brand electrical connector, type UR, splices, insulates and moisture-seals in two simple steps, saving up to one-third to one-half the time required for conventional twist and sleeve splices.

The connector is designed to accommodate any 2 or 3-wire combination of No. 19 to No. 26 AWG solid or No. 20 to 26 AWG stranded wire, and handles all common types of insulation, including plastic, rubber, enamel and teflon. The resulting splice is the functional equal of twist and solder jointing methods, with an average pullout resistance equal to 95 per cent of wire breaking strength.

Made of a transparent thermoplastic material, filled with silicone grease, and incorporating a metal finger-like connector element, the "Scotchlok" UR connector makes

*Mr. Leach is supervisor, Electro-Mechanical Product Development, Minnesota Mining & Manufacturing Co., St. Paul, Minn.

Wires are cut to length and inserted in the "Scotchlok" UR connector. No stripping of wires is necessary, transparent sleeve permits visual check of wire insertion and completed splice.



Special crimping tool is used to squeeze red button into connector, to strip wires and complete splice. In completed joint, red button is flush with transparent sleeve. Wires are connected, insulated and moisture-sealed.

available for the first time a simple method of making communication wire splices.

In use, wires are inserted into the connector and secured simply by squeezing a button into the connector sleeve. As the button is depressed, the finger-like connector element strips the insulation and grips the conductors, providing a strong mechanical, electrical joint. The thermoplastic sleeve insulates and protects the splice, and the factory-installed silicone grease moisture-seals the joint.

Visual inspection of the connection through the transparent sleeve, and the flush position of the red button when fully depressed, insure complete and functional splices every time.

A lightweight, crimping tool with parallel action jaws, to speed application and insure complete actuation of the connector, has been specially designed by 3M Co. The tool is designated as the "Scotchlok" brand crimping tool model E-9 series.

Universal in size, the "Scotchlok" UR connector will fit all sizes of wire commonly used in the communication industry. Splices made with the new connector on cable up to 400-pair in size will fit into splice cases and enclosures currently in use.

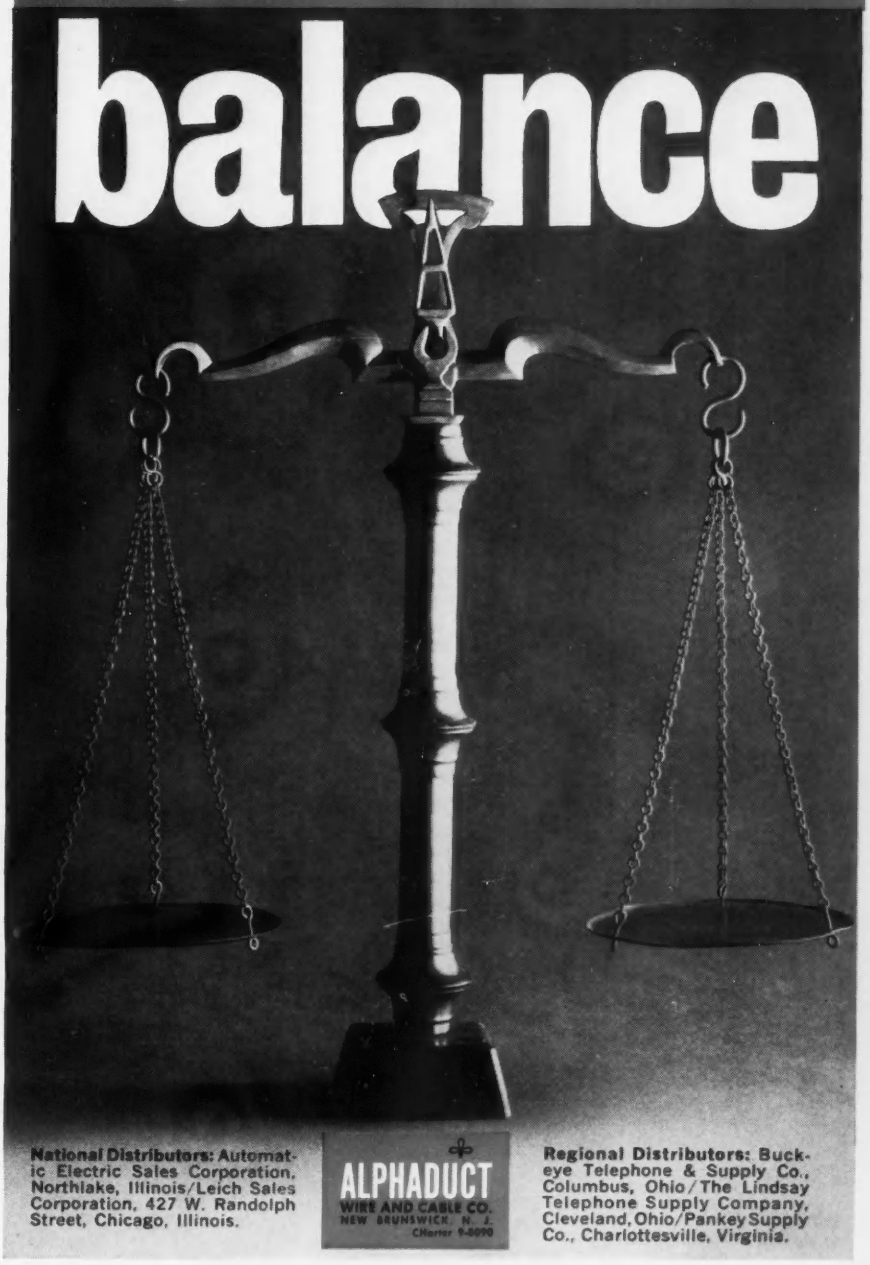
The "Scotchlok" brand electrical connector, type UR, is the result of a research and development program that was started in 1953 when the Electrical Products Division of Minnesota Mining and Manufacturing Co. (3M) began research and development in the plastic telephone cable splicing field, to design a method of protecting splices in small plastic insulated conductors.

This project to solve an industry-wide problem was aided by the continuous interest and encouragement of the Telephone Engineering Division of the Rural Electrification Administration.

In the beginning, design efforts followed two lines of approach. The first, the mass production method, was aimed at isolation of a splice by blocking the cable and encasing the splice in a watertight enclosure, or by solid impregnation of the splice with a fast-reacting liquid epoxy

Balanced breaking strength of the conductors—400 pounds plus, with #18 AWG, 30%, copperweld. Adhesion of the insulation—strong enough to prevent slipping at maximum load without physical or electrical failure. Neoprene jacket—tough, abrasion and weather resistant with enough "beef" to prevent buckling at the "P" clamps all the way up to maximum conductor strength. Compression cutting resistance—no break-down in "P" clamps up to the overall breaking strength of the conductors. In Alphaduct Reinforced Drop Wire there is no "weakest link". The combination of these four features manufactured into every foot of Alphaduct Reinforced Drop Wire, assures you perfect built-in balance. Not every drop wire has it...and remember, it's dated for comparison.

Reinforced drop wire with built-in balance



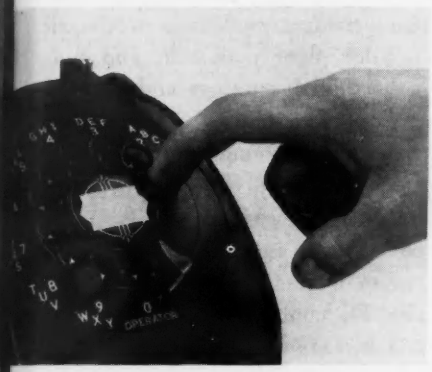
National Distributors: Automatic Electric Sales Corporation, Northlake, Illinois/Leich Sales Corporation, 427 W. Randolph Street, Chicago, Illinois.

ALPHADUCT WIRE AND CABLE CO. NEW BRUNSWICK, N. J. Charter 9-5090

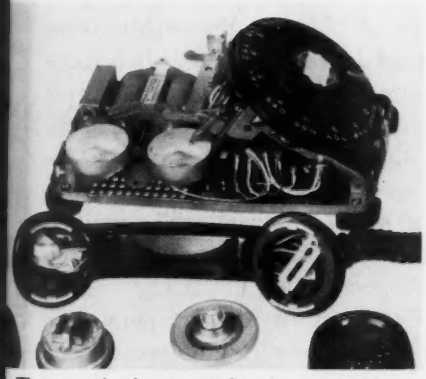
Regional Distributors: Buckeye Telephone & Supply Co., Columbus, Ohio/The Lindsay Telephone Supply Company, Cleveland, Ohio/Pankey Supply Co., Charlottesville, Virginia.

Type 80 is shaped so that the handset almost automatically "walks" into the cradle—cuts down off-hook trouble. Handset is slim and light.

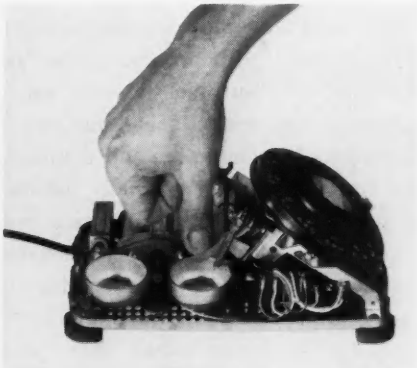
only Type 80 offers you all these features!



Dialing is dependable, always easy, unusually silent. A new dial mounting slides on and off in a jiffy—there are no screws to loosen.

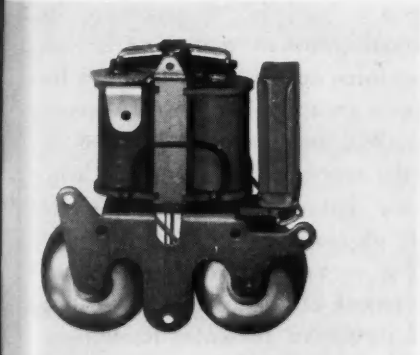


Transmission speaks for itself in a loud, clear, lifelike way. Sidetone and nearby noises are minimized—line loss is largely overcome.



Installer's hooklock keeps hook down during installation—service man has both hands free. No calls are lost, no switches tied up.

Installation requires *only* a screw driver—you save on man-hours. Maintenance is rare. Components are screw-mounted and interchangeable.



Ringing is of ample volume at all frequencies. Ringer and ringing condenser are mounted as a unit—saves time and prevents mismatching.

Every telephone you buy is an investment. Naturally you want the best quality...the best value. Remember these features about the Type 80. Remember, too, that Type 80 is available in 10 decorator colors. To order, contact your AE salesman or write: Automatic Electric Sales Corporation, Northlake, Illinois. In Canada, Automatic Electric Sales (Canada) Ltd., 185 Bartley Drive, Toronto 16.

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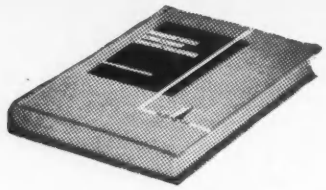

Save time and work in engineering design

Just Published! Here's a practical manual of tested product-engineering aids to help you get quicker, easier solutions to everyday work problems. It offers a ready-made file of methods, formulas, tables, and charts for engineering top efficiency into devices, components, or complete products. Covers a full range of topics, from accessories and assemblies to clutches, control devices, electrical components, etc. Includes such modern developments as ultrasonics and automated assembly. *Over 1100 drawings show vital design details.*

PRODUCT ENGINEERING DESIGN MANUAL

Edited by Douglas C. Greenwood

Editor, Product Engineering Design Digest

342 pp., 8½ x 11, over 1100 illus., $9.

The book provides a storehouse of material to stimulate you to new design ingenuity, and to help you gain improved mechanisms, better assembly methods, and savings in materials and time. Over 100 topics are systematically arranged and illustrated. You can see how each device works, what it does, and how it meets design requirements. **Thus, the book gives you the "feel"** of a problem by showing in detail what is good, what has been done, and what is acceptable.

Gives up-to-date facts and data on resistors

Just Published! **This book thoroughly covers fundamentals and needed data in the use of resistors in electronic design. You get groundwork in the basic aspects of resistance and descriptions of each type of resistor, the materials used in its manufacture, and characteristics associated with each type. Comprehensive tables give most manufacturers' data, with specific types of resistors covered in common tables. Thus,** a design or components engineer can easily determine the scope of what is available. Full attention is given to such important areas as reliability in resistors, measurements, etc.

RESISTANCE AND RESISTORS

By Charles L. Wellard

Technical Director, Clifton Precision Products Co.

264 pp., 6 x 8, 82 illus., $8.50

Among the book's many special features you will find a detailed treatment of precision films as a replacement of wire-wound resistors. Included, too, is information on the preparation of precision films by pyrolysis, evaporation, and reduction of oxides. Numerous charts and graphs present information that heretofore has seldom been readily available regarding the power and voltage ratings of resistors, the varieties of material used in their construction, and their many industrial applications.

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resin. The other approach, to develop an individual connection method, was aimed at sealing each individual joint, combining connection and protection in one mechanical connecting unit.

In 1956, after three years of study and development along both lines of approach, full attention was devoted to development of the individual connection method, reserving the known techniques of mass protection for special applications.

Because of the requirements inherent in a truly universal connector, a number of goals were established at the beginning of this phase of the project. The goals included: (1) reliability and permanence, functionally the equivalent of a twist and solder connection; (2) a water impervious seal to all conductors used in telephone cable construction; (3) minimum labor cost and maximum conductor safety, with no stripping of wire insulation required; (4) compact size and unobtrusive shape, and (5) over-all saving over existing methods.

Secondary, but important specifications were also set forth: (1) a single operation to connect and seal, using a simple tool, if one should be required; (2) sufficiently wide range in one size unit to accommodate all numbers of conductors and combinations of wire gage normally encountered; (3) equally efficient as a connector for plastic or paper insulated conductor, and (4) adaptable to aluminum or other conductors, or to plastic insulation other than polyethylene.

The development efforts were divided into two classifications — connecting and sealing — each regarded as equally important to the problem of splicing plastic insulated telephone cable.

Since the no-stripping feature was considered a basic requirement for the communications connector, investigations of insulation removal methods were closely tied to the method chosen for completing the electrical connection. Five possible methods of displacing the insulation existed, all requiring that pressure be exerted on the connector. The methods included: flowing the thermoplastic insulation away from the contact area; extruding the plastic from the contact area through perforations in the connector; piercing the insulation by means of sharp projections or cutting edges; melting the plastic from the wire end, or shearing the plastic from the conductor at the points of contact. The shear method was adopted as being the most reliable and permanent.

In 1958, following approximately two years of laboratory work, and experiments with several different versions, the first model was produced in a pilot plant operation and put into the field for testing and evaluation. Designated as the "Scotchlok" TR connector, it employed the shear technique for displacing the conductor insulation, was self-sealing with silicone grease and was universal for all common sizes of wire encountered.

The TR connector, however, presented two significant drawbacks. It required expensive production techniques, and the tool required to squeeze the connector, an expensive pneumatically operated tool, was not practical for general field use.

The communication connector program at 3M was thoroughly reappraised in January, 1959. It became apparent that the practical answer was in a variation of the shear method that contained the essential ingredient — resilient spring compression reserve — and still permitted installation simplicity and production economies.

These features are incorporated in the UR connector. In squeezing the connector button into the body of the connector, and forcing the metal fingers over the wire, an outward pressure is exerted on the back of the connector element. This constant pressure, in trying to return to its original position, maintains a constant force on the conductors and insures a continuing electrical connection. With this principle designed into the connector, problems of connector failure and erratic service were overcome.

The second area of effort in development of the connector, sealing and insulating, presented fewer basic problems, since the moisture-proof-

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Budelman Type 16-B Carrier will:

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- Provide new circuits to new stations in areas beyond the 1200 ohm loop.
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GO MEASURE IT!"

USS Tiger Brand Amertel 195 is a high-strength telephone wire that can be strung in light loading areas to spans of 700 feet; to 650 feet in medium loading areas; and to 600 feet in heavy loading areas. Fewer poles are needed, construction costs are the lowest.

What's more, Amertel 195 offers improved voice transmission efficiency and greater protection against failure from ice loads. It has been known to stand severe ice loading without breaking. Yet when the ice melted, the wire for all practical purposes, resumed its original stringing sag.

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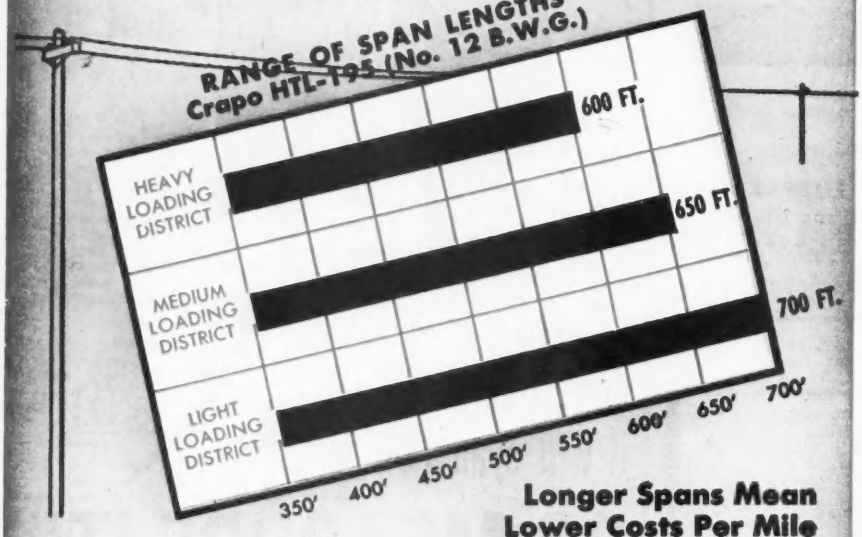

Longer Spans Mean Lower Costs Per Mile

You can cut the number of pole structures to a minimum when you use *Crapo* HTL-195 in building rural telephone lines. Extra long span construction, made possible by the high physical strength of this new wire, means marked savings in material and installation costs.

The voice transmission quality of *Crapo* HTL-195 is equal to that of *Crapo* HTL-135 and superior to older grades of ferrous wire.

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INDIANA STEEL & WIRE COMPANY, INC.
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ing qualities of silicone grease had been demonstrated and accepted in the earlier grease-filled splicing sleeves. Following experiments with several different connector shapes, the present form was adopted, as being easy to handle and suitable for space requirements of the splice enclosures currently in use.

In addition to thorough and exhaustive laboratory tests, designed to accelerate aging of sample connectors under artificial means, approximately 300,000 UR connectors have been placed in field service during the past year. Installations have been made under various types of adverse conditions and under a variety of physical and geographical conditions, including mountainous and swampy areas, hot, cold and humid weather conditions, storm areas and under repair conditions. All tests and reports have indicated that the new connector is dependable, with the high reliability necessary for all field conditions. — *E. E. Leach.*

AE Adds Anti-Slug Protection Feature To Paystations

A NEW anti-slug protection feature has been added to all postpay and semi-postpay paystations manufactured by Automatic Electric Co.

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ACCOUNTING DEPARTMENT NOTES
By G. M. JONES

VI: Depreciation Theory and Practice

It is dangerous to attempt predictions in any political-economic area, but the one of recent hearings and the history of inch-by-inch concessions toward more rapid writeoff suggest four possible submissions to Congress. (Continued from the April 1 issue.)

Prospects For Acceptance Of Proposals

OF THE four propositions advanced here, only the last appears to have met with a favorable reception in either the Congress or in the Treasury Department. This proposal was embodied in H.R. 131 (the Keogh bill) in the last session of Congress, after much testimony directed toward acceptance of the principle of reinvestment depreciation, over the opposition of the Treasury. The position of the Internal Revenue Service was rather clearly indicated by Treasury Undersecretary Fred R. Scribner's remarks last spring to the Tax Executives Institute:

"There are many taxpayers who would like to have a depreciation policy which would allow them not only to recover the full cost of a machine, but would like, in addition, to recover a sufficient amount to pay the full cost of a new, modern replacement. This approach to the depreciation problem, I am sure you will appreciate, might get us into very shaky and untenable ground. We would leave the certain and demonstrable base of original cost and might move into the area of hypothetical and questionable appraisals of replacement cost. This approach does not seem to have the elements of a realizable program." (Journal of Taxation, April 1959, p. 216.)

The only apparent progress made toward the desired adjustment for price-level changes in the last Congress was the provision for permissive acceleration to the extent of 20% of cost of new assets in the first year, but this was applicable only to the first $10,000 of investment, and only to assets with at least a 6-year useful life. This was not a real move toward economic depreciation, but another form of accelerated depreciation, with the same effect as the declining-balance methods authorized by the 1954 code changes.

Testimony before the Committee on Ways and Means, beginning Nov. 16, 1959, has for the most part lent support to the demands for economic depreciation. Such outstanding figures as W. A. Paton, Maurice Peloubet, and George Terborgh have presented the case for either economic depreciation, accruals year by year, or for reinvestment depreciation at time of retirement/reinvestment. Other proposals made include the adoption of the British practice of allowing a heavy deduction of cost in the first year of asset purchase, with an authority for the Treasury to permit further tax credit in periods when investment expenditure lags; a reclassification of assets according to the Canadian practice, where classes of assets are depreciated at group rates rather than as individual items; and the creation of a new "capital cost allowance" concept to replace the depreciation concept entirely. Under this latter proposal, managements themselves would determine the length of time over which capital cost would be spread, and they must also maintain their book records on the same basis, and forego the "capital gains" treatment now accorded to gains on disposition of capital assets. The taxpayer would be free to determine useful (economic) life, but would be restricted to recovery of amounts no larger than original cost.

Predictions

IT IS always dangerous to attempt predictions in any political-economic area. But the tone of the current hearings and the history of inch-by-inch concessions toward more rapid writeoff suggest the following probable submissions in the next Congress:

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(1) A proposal to adopt the Canadian bracket system for grouping assets, with a schedule of lives for each group corresponding somewhat more than at present to technical and economic life.

(2) A proposal to raise the present $2,000 limit on first-year special depreciation on new assets.

(3) A renewal of the proposals of the Keogh bill, allowing the use of reinvestment depreciation in the year of asset retirement, with the extra depreciation charge to be subtracted from the cost basis of the new asset acquired.

(4) A scrapping of Bulletin F, the Treasury guide to service lives, and instructions to the Treasury to develop a more up-to-date guide, attaching much more importance to economic obsolescence.

Because of the extended time required for hearings and committee work, and the necessarily political complications along their arduous

route through both houses, these proposals will not be enacted into legislation during 1960. However, some elements of them will be incorporated into revisions of existing tax accounting requirements. Probably Bulletin F revision is most likely to succeed; and some measure similar to the Keogh bill is a good candidate; but its restrictions will be such that most businesses will not hasten to adopt it.

Economic depreciation, per se, will not be accepted because of strong continued opposition to letting "the corporations" get more than their investment back. Terborgh, in his paper for the Ways and Means Committee, reported that, historically, it has required an inflation of 200% or more to overcome the opposition to price-level adjustments in other countries. We have not yet reached the level where the drain on capital is so great that correction is a political necessity. — *Dr. Gardner M. Jones.*

Suggested Current Reading On Economic Depreciation

For:

Paul Grady, "Economic Depreciation," *Journal of Accountancy*, April 1959, p. 54

William A. Paton, "Depreciation — Concept and Measurement," *Journal of Accountancy*, October 1959, p. 38

Michael Schiff, "What Happens to Depreciation," *Journal of Accountancy*, March, 1959 p. 37

Against:

Charles Melvoin, "Depreciation in Accountants' Reports," *Journal of Accountancy*, November 1959, p. 34

Rudolph Malandro, "Depreciation Is Not the Problem," *NAA Bulletin*, September 1959, p. 25

Varied:

House Committee on Ways and Means, *Compendium of Papers on Broadening The Tax Base*, Vol. II, (Washington: U. S. Government Printing Office, December 1959), pp. 793-931

John R. H. Gilmour, "The Need For Price-Level Depreciation Poses a Challenge to Accounting," *NAA Bulletin*, July 1959, p. 29

Willard J. Graham, "Depreciation and Capital Replacement," *Accounting Review*, July 1959, p. 367

Richard K. Hill, "Explaining Depreciation — a Conference Drama," *NAA Bulletin*, August 1959, Sec. 1, p. 59

Carman Blough and Paul Grady, "Depreciation — To Measure Income or To Provide Funds for Replacement?" *NAA Bulletin*, August 1959, Sec. 3, pp. 47-63

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SUTTLE Equipment Corp. has announced its new supply catalog is now available. This catalog (No. 90) describes a complete line of telephone supplies and pole-line hardware.

In addition, special attention has been given to REA approved product listings in many categories of materials and supplies.

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Microwave Antenna Catalog

ANDREW Corporation has issued its new 1960 Microwave Antenna Catalog. This 16 page catalog provides detailed engineering data on 60 antennas covering all current commercial and military microwave frequency ranges.

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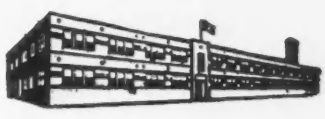

ELECTRO-TINNING of copper wire for telephone switchboard cable is one of the important manufacturing processes at West Electric's Tonawanda Plant. Peter Opolka (left) and Norman Brown oversee the machine as a micro-thin tin coating is electrolytic deposited on copper wire as it passes through a plating bath. This thin deposit of tin makes the wire easier to solder during installat

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Western Electric employs the skills and talents of some 1900 local men and women to help carry out this assignment. In addition, we purchase large amounts of the equipment and materials we need from 446 firms right in the Buffalo area (and from 5634 suppliers throughout New York State).

How else has Buffalo benefited? The gains pop up all over town – in wages and salaries spent with hometown stores, jobs created, taxes paid to local government. Plus participation by W.E. people in civic and social affairs. It all adds up to our share in building a better Buffalo.

TUITION REFUND PLAN, sponsored by W.E., helps Engineering Associate Donald R. Manweiler towards a B.S. degree in electrical engineering at University of Buffalo night school. Many Tonawanda employees attend college under this program.

Besides Buffalo, Western Electric has 12 other principal manufacturing locations, where we also make hundreds of different products for the Bell System and for the government, mainly for national defense. Last year we purchased over a billion dollars' worth of raw materials, products and services from our more than 35,000 suppliers located in every state of the Union. Of these, 90% are "small businesses." The things we make and buy are distributed to the Bell telephone companies through Western Electric distribution centers in 32 cities.

LOCAL SUPPLIER Stanley M. Knapp, Jr. (left), Vice President of Trimold, Inc., discusses a new plastic cable boot with Donald A. Miller, a member of the W.E. buying staff. This product saves time and money in connecting Call Director telephone sets.

Western Electric

MANUFACTURING AND SUPPLY UNIT OF THE BELL SYSTEM

LOOKING IN on New York's historic Old Fort Niagara are Clarence W. Weis, his wife, Raili, and their children, Michael and Lisa. Mr. Weis, a machinist, has worked at Western Electric's Tonawanda Plant for 13 years.

RED CROSS WORKER, W.E.'s Lottie McCallum, assists disabled veterans in her part-time, voluntary job of driving Red Cross cars. She has been devoting most of her spare time to this for 15 years.

COMMERCIAL DEPARTMENT NOTES
By ALLAN R. STACEY

Your Supplemental Equipment Rates

SCHEDULE No. A-15 of our company's filed tariff is entitled, "Supplemental Equipment." This contains rates applicable to miscellaneous supplemental equipment and, only a few years ago, used to be confined to a number of pages that you could count on one hand. Now, it seems to me that every month we have a filing to add another page containing a new supplemental equipment service.

There was a time about the only things we offered in the way of supplemental equipment were extension bells and gongs, keys of two or three kinds, indoor booths or outdoor booths which the subscriber never rented from us anyway, jacks and plugs, special boards and key telephones.

A few years ago we had a filing for colored telephones and at about the same time a filing for answering machines.

Supplemental Equipment Grows

TODAY we are expanding our service to offer items like volume control telephones, lighted dial instruments, special answering cabinets, public address systems or intercommunicating systems, hands-free loudspeaker telephones, exclusion features and many others.

Tomorrow we shall probably be offering automatic dialing units, alarm circuits, dataphone equipment, message waiting lamps, front door answering units, dial-in-handpiece telephones, three-position chimes and many more.

Rates for supplemental equipment bear careful watching. Sometimes we find that they no longer, if they ever did, bear the proper relationship to the service being provided.

All too often we are prone to increase the rates for supplemental equipment on a percentage basis at the same time that we go in for a general rate increase. Now I suspect that when rates for some of our supplemental equipment that has been offered for many years were established they were not, at that time, particularly sound. Often a commercial engineer just sat down and said, "Well, this item ought to be worth so much a month to a subscriber." As a result, in some cases, we started from an unsound base and added percentage increases which brought us up to today's distorted rate.

The danger in this is that sooner or later we come to a point where the supplemental equipment rate is unrealistic. For example, I recently heard of a company that, through this practice, came to a point of charging $30.00 per month for electronic secretary answering machines. The result was that these machines began to pile up in that company's warehouse and they had a shelf full of answering machines earning no revenue at all.

What Supplemental Equipment Rates Should Be Doing

AS I SEE it today's supplemental equipment rates should be doing three things. Number one, these rates should actually reflect today's operating conditions. Number two, the rates should be such that we're neither pricing ourselves out of the market nor giving away the service. Number three, these rates should be so arranged that they assist the maintenance and installation practices of our company rather than hinder them.

Let's look first to see whether the tariff reflects today's operating conditions. In one company's tariff we find offering of a service for an amplifier handle unit in a telephone at an extra $.50 per month. As you are aware, this item has now been superceded by the more modern volume control telephone instrument with a control button in the sub-set in order that the customer can turn the volume up or down. The older style amplifier handle merely had one level of adjustment, loud or not loud. The new instrument permits graduated increase of the volume. However, neither the equipment description nor the tariff rate truly reflects today's volume control telephone being offered to the public. I suspect that the $.50 rate is wrong and I am sure the description of the service as "amplifier handle unit" is erroneous.

One tariff offers a "head receiver" to be used in addition to regular hand receiver on primary or extension stations. Charges for this are $.25 for a "single head receiver" and $.50 for a "double head receiver." (I have often wondered who bought the receivers with the double heads.) In addition, this tariff still offers a monthly rate for a "chest transmitter and head receiver." Certainly, more modern equipment does the same job today and probably at different costs than those which were used to justify the rates mentioned above.

Helping Maintenance Practices

SUPPLEMENTAL equipment rates should be designed to assist the

maintenance and installation practices of the company and should be reviewed to see that they agree with changes in these practices. A good illustration is the case of one company that was charging $5.00 as an installation charge for placing a 25 foot long cord. There was no monthly rental on this but when the cord was worn out the customer was required to pay another $5.00 for the installer to visit the premises and place a second long cord.

The result was that there was an argument between the troubleman and the subscriber whenever trouble developed in the long cord to the point where the company thought it should be changed out. The subscriber was reluctant to agree to the changeout because it would cost him another $5.00. This company adjusted its supplemental equipment tariff so that an initial charge of $10.00 was made for installing a long cord but there would be no subsequent charges for later replacement of the same cord at the same premises.

In this way, the tariff structure assisted the maintenance practice of the company rather than hindered it. You probably know more examples of this type of situation than I do.

Earn A Good Return, But —

SUPPLEMENTAL equipment rates are not like those for backbone telephone service. Supplemental equipment is risk business in that the user can still have telephone service without availing himself of the special equipment. Accordingly, he may disconnect the latter at any time although he continues telephone service. As a result of this, it is my feeling the rate structure for supplemental equipment should be set so as to yield a rate of return not less than 50% more than that provided by basic telephone service, or the over-all rate of return of the company.

However, there are two sides to the coin. We must set the rate high enough to yield a rate of return that reflects the risk involved in the business but we must not set the rate so high that we price ourselves out of the market, witness the return of the answering machines mentioned above.

Form Used To Develop Proposed Rate

THE QUESTION is sometimes asked, "How do you compute the rate of return on a particular item such as a hands-free loudspeaking telephone?"

Several companies out West are using a form which outlines the steps to develop a monthly rate and an installation charge for items of supplemental equipment. This form considers such factors as the life of the equipment, the original cost, the estimated annual charges including maintenance, depreciation, administration, etc. and then produces a proposed rate treatment. The rate treatment includes the installation charge and a monthly rate.

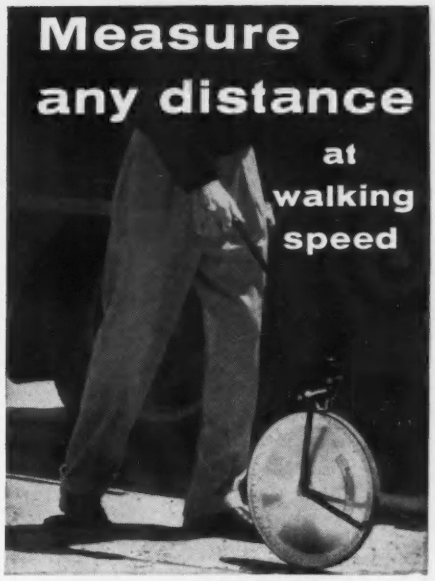
Naturally, these two latter items are based upon not only arithmetic which produces a rate, but judgment which determines whether the rate is acceptable to the subscriber and to the company. If any of you would like a copy of this form, please drop me a line and I'll be happy to supply it since I recommend it highly for determining a rate for any particular piece of supplemental equipment.

Summary

NOW LET'S summarize briefly. It seems to me that we have said that it's time to take a look at our supplemental equipment rates in order to see that they are now doing the following things:

1. Relating properly to our current maintenance and installation practices.
2. Keeping the tariff clean so that it has only the items that we now want to provide and does not continue obsolete offerings.
3. Establishing a tariff rate for supplemental equipment that will earn a rate of return at least 150% of the average return for the company and yet will not price us out of the market for this service.

Well, that's all for now. Next issue we'll be talking about dealing with your local press and we'll discuss a guide for effective press relations. See you then. — *Allan R. Stacey.*



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"SUB-HARMONICS and OVERTONES"

By C. D. EHINGER

Part II: Fundamentals of VNL

In this second article on VNL, Mr. Ehinger continues the discussion of the factors that limit transmission levels. Part one of this article appeared in the June 1 issue.

IN THE previous issue, we had started to investigate one of the factors which limit the levels which can be attained in practical transmission circuits. *Fig.* 1 (page 71) shows a simple 4-wire circuit using hybrid coils and some form of amplification, or repeaters. When energy, in the form of voice communication (C), is introduced into the circuit at the point A, the energy travels down the transmitting side of the circuit as indicated by the heavy black arrows through the repeater, where it is magnified or amplified (C_M) and enters the distant hybrid coil at point B.

Talker's Echo

UNDER the condition of perfect balance, which means that the balancing network exactly matches the impedance of B in magnitude and phase angle, the energy will be split into two parts and will be absorbed in the balancing network and by B, the desired point of delivery.

However, because of many factors, such as different impedances presented by each termination in each different call, impedance variation over the frequency band, etc., we do not have cases of perfect balance and the incoming energy does not split into just two parts. Instead, it will have a third component, which is shown on the diagram as C_E (or echo energy), which enters the transmitting path of point B and heads back toward the originating point.

This is shown on the diagram by the dotted arrows in the upper branch of the circuit. This echo energy (E) is amplified by the repeater and enters the hybrid coil at A. Here, again, the same conditions prevail as at the far end hybrid. A certain portion of this echo energy will not be fully absorbed by the balancing network and the subscriber termination A, but will again enter the transmitting path of point A as shown on the diagram. The originating party A receives the portion of the energy labeled as E_T in his own ear.

This part of the echo is called "talker echo" and is quite annoying to the subscriber. This is the reason for the "hollow" or "rain-barrel" sound of a circuit and usually causes the originating party to become halting in his conversation as he cannot be perfectly certain whether he is hearing his own echo or whether the called party is interrupting.

Listener's Echo

AS PREVIOUSLY pointed out, a small portion of this echo energy leaks across the circuit to the transmitting path and again travels down the circuit toward point B. This is shown by the dotted arrow labeled "E_L" and is called "listener's echo."

The value of these echoes at points A and B (the "talker's echo" and the "listener's echo") is a function of the amount of impedance mismatch between the balancing network and the impedance at either point A or point B. This value is called "terminal return loss" and can be computed as follows:

Terminal return loss $= 20 \log_{10} \frac{Z_N + Z_L}{Z_N - Z_L}$ where Z_N is the impedance of the balancing network and Z_L is the impedance of the termination

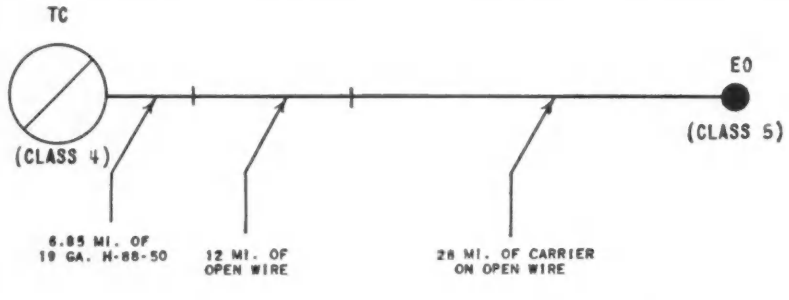


Fig. 2 Problem: What loss for distance dialing operation?

Answer to Problem in First Issue:

Since the circuit between the two offices terminates in an end office (Class 5), transmission level should be engineered for VNL+2. The calculations are as follows:

Distance		VNL factor		
6.85 mi.	×	.03	=	.2055
12 mi.	×	.01	=	.12
28 mi.	×	.0017	=	.0476
				.3731
Maintenance Variation				.4
Termination Loss				2.0
Total (VNL+2)				2.77

(either point A or point B).

In practice, nearly all of the echo problems arise between the frequency range of 500 to 2500 cycles per second.

Human Limitation To Echo Tolerance

THE GREATEST limitation to the amount of echo which can be tolerated on a circuit is the human limitation. In other words, we dare not have more echo present on any toll circuit than will be tolerated by a very large percentage of our subscribers. This, of course, presents the usual difficulties in determining just what is "tolerable."

As an example, you and I as telephone people will be much more intolerant of echo on a toll call since we are, to greater or lesser degree, more familiar with the operation of the telephone industry. Again, Joe Doe may be rather tolerant of a certain amount of echo today but tomorrow, after a bad night, may become extremely irritated with the same amount of echo on a circuit.

A great number of field tests and experiments have been made on this degree of tolerance on the part of our subscribers. It has been discovered that the amount of tolerance varies with the length of time that is required by the voice to make the round trip from the talker to the listener and back to the talker.

On extremely short circuits it has been found that the average subscriber will tolerate a minimum loss in the echo path of approximately .5 db. Where the round trip requires 50 milliseconds, tolerance is down to approximately 20 db. minimum loss in the echo path and where the round trip requires 100 milliseconds, tolerance is down to approximately 30 db minimum loss in the echo path.

Singing

AGAIN referring to *Figure One,* it can easily be seen that if the value of the energy returned to point B, as "listener echo," is large enough, a condition has been built up whereby additional amplification again results and the circuit breaks into a condition known as "singing." While most of the echo problems are contained in the band of frequencies between 500 and 2500 cycles, singing occurs most often between 250 to 500 cycles and from 2500 to 3000 cycles.

Although the singing ranges of frequencies are actually outside the echo range of frequencies, they are caused by the same functions which allowed echo conditions to exist. A singing condition of a circuit is usually preceded by a "waterfall" sound or a "rain-barrel" effect. In order to avoid singing on a circuit, it is necessary that a minimum margin of 5 to 6 db against singing conditions be maintained at every frequency under the worst possible circuit conditions. This is a minimum standard, and, if at all possible, a higher margin should be maintained.

The third item or factor which tends to degrade transmission levels is "noise and cross-talk." We will discuss this item in the next issue, list Via Net Loss Factors, and give examples of methods to use these factors in computing toll circuit requirements. *(To be continued.)*

Any comments, criticisms, or suggested subjects for future topics? Address all correspondence to "Sub-Harmonics and Overtones," Telephone Engineer & Management, 7720 Sheridan Road, Chicago 26, Illinois.

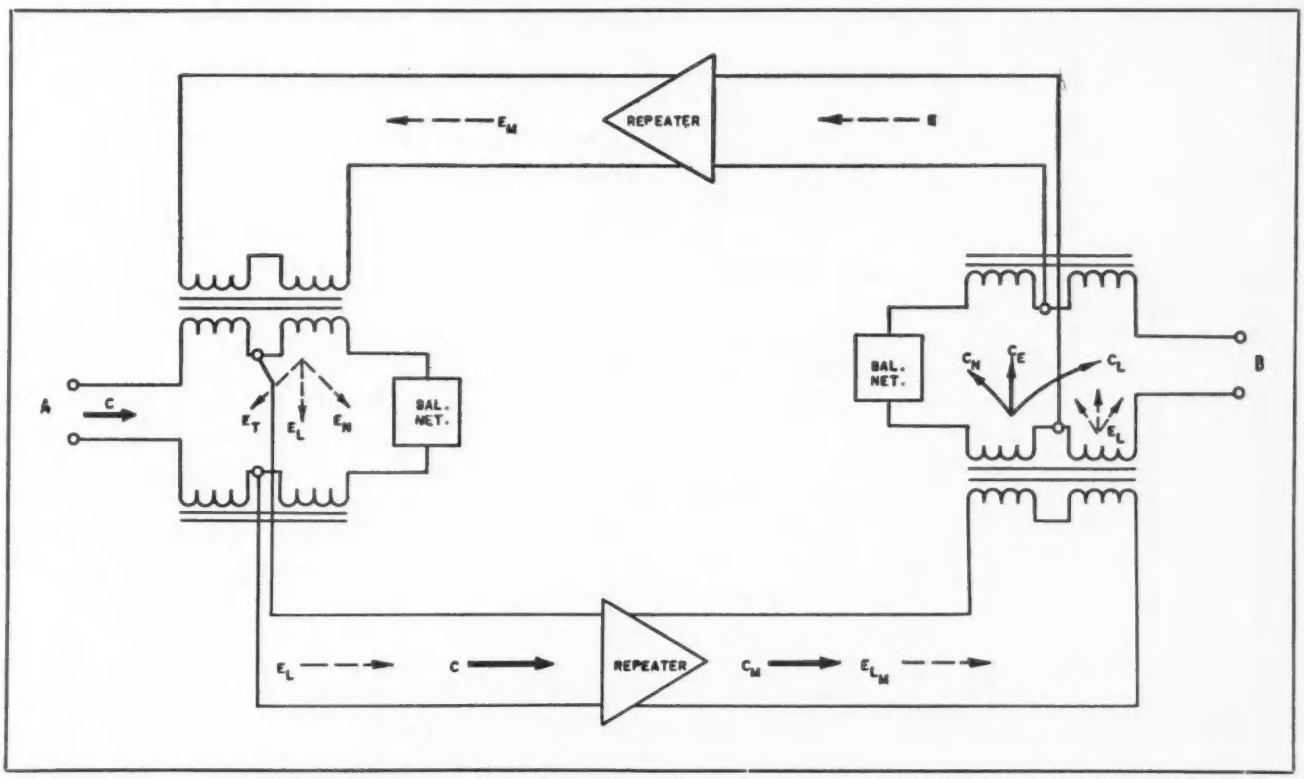
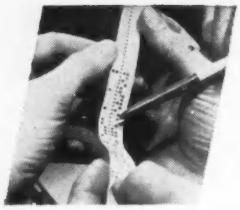


FIGURE ONE: — Energy paths (and undesired paths) in typical toll call.



"TRAFFIC LIGHTS" by D. A. PERIGO

Be Prepared For Obsolescence

When obsolescence is too fast for the depreciation rates, the company winds up with a depreciation reserve, which is a minus quantity. This is a major problem in some fast growing companies — a problem that must find recognition in rates.

IT HAS never been our intention to make this column one for the specialist. We believe the greatest good is accomplished by having employes who understand their first obligation is to the Company — and the department one is in becomes secondary. Such being the case Traffic people have interests in other phases of the business — particularly those places where the industry faces problems.

We think one of the big problems of the present and immediate future is one of rapid obsolescence. We jotted this note at one time and failed to mark the author's name — "*Yesterday's gadget is today's standard, and tomorrow's cast-off.*"

This says to us there is a development period, a use period, and then something better comes along. It wasn't so long ago that we drove through the rain with only one hand on the wheel — the other was swishing a windshield wiper back and forth so we could see. Today, cars are delivered with motor driven windshield wipers — even in Southern California. They are taken for granted and not even a sales point anymore. Tomorrow? Who knows? Maybe a few drops of rain will start the wipers automatically.

In 1876 the telephone itself was merely a gadget. Since then other gadgets have been added in the telephone industry — accepted — and taken for granted. What about tomorrow?

Most of the equipment being installed in our offices today is obsolete before it is installed. This does not mean it isn't usable but that we know better items of equipment have been designed and will be available in a future period. We know that electronic switching provides a very compact central office — but we are still spending millions of dollars to provide building space for present day "conventional" central office equipment.

A lot of this equipment will be replaced long before it is worn out — and long before enough depreciation has been charged to pay for it. Obsolescence is a part of depreciation. When obsolescence is too fast for the depreciation rates charged we eventually wind up with a depreciation reserve which is a minus quantity. This is already a problem in some fast growing companies — and must find recognition in rates.

Obsolescence of The Subscriber's Telephone

WHAT about the obsolescence of the subscirber's telephone, especially since the advent of color? We have consistently maintained that the Telephone Company should own and maintain everything including the subscriber station equipment — even though other utilities end their investment at the point of entrance to the customer's premises. One of the reasons we have used is that compatibility requires standardization. There is no question about the importance of this in the past — but what about the future?

Today we can originate a call on a Kellogg telephone connected to Automatic Electric central office equipment that connects with Stromberg automatic ticketing to be carried over Lenkurt carrier circuits to a Western Electric 4A switching center, and then over Collins microwave to terminate on Leich central office equipment where the called party has a North telephone. Transmission is better than it once was across the street. Proper signalling occurs all along the route.

The courts have already let the bars down on "foreign attachments." The question of interconnection with private systems keeps popping up with a great deal of consistency.

One of the weakest arguments that can be used for the continuance of something is to say, "It has always been done this way." How can we use such an argument and in the same breath say how progressive we are?

What is wrong with the Telephone Company terminating its investment where we enter the subscriber's premises? Suppose we sell telephone sets on a retail basis even with a conditional sales contract if necessary. What would be the result?

One of the results would be that the problem of obsolescence is taken care of by the customer. If the customer wants to change the color or model of the set in his living room he stops in, shops for what he wants,

and takes it home with him.

As the movement toward individual line service continues we can see the possibility of a subscriber moving from one house to another, taking his jack and plug telephones with him, and plugging them in at the new location. All we would need to do is change jumpers in the central office and correct the records.

Suppose we sold everything that is now in Plant Accounts 231 and 232 to our present subscribers. How far would that money go toward providing the outside plant to upgrade our customers to one and two party services?

Sure, there would be some problems in making such a change — but aren't there problems with dial conversions, DDD, and Mark Sensing?

Among other things there would be an entirely new concept of rate structures — but these rate structures need an overhauling anyway.

Our obligation is to stimulate thinking. We don't know whether having subscriber ownership of station equipment is good or bad — but we think we see signs that indicate the courts will eventually say the subscriber has the option of owning or renting his station equipment. If and when that time comes, what kind of shape will your company be in?

The Boy Scouts of America have placed emphasis on two exceptionally good thoughts — "Do a good turn daily" and "Be prepared." This is our good turn for today — will you be prepared? — *D. A. Perigo.*

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SUBSCRIBER CARRIER

(Continued from page 49)

such a system is to be used with more than one carrier physical pair in the same lead, crosstalk measurements should be made.

The method of making such measurements is illustrated in *Figure* 13. The equipment is the same as that shown in *Figure* 12 for measuring line attenuation, except that two 600-ohm terminating resistors are added. The oscillator is connected at end A of line AB and a 600-ohm resistor terminates end B. The tuned db meter is connected to the opposite end D of the other line CD with a 600-ohm resistor terminating end C. This arrangement measures the far-end crosstalk of the two lines. The reading for near-end crosstalk is obtained by shifting the db meter to end C and the 600-ohm resistor to end D as indicated in *Figure* 14.

With the db meter connected as shown in *Figure* 9, but the oscillator transmitting from end B and 600-ohm resistor terminating end A, the far-end crosstalk is determined. The near-end crosstalk reading is then obtained with the db meter moved back to point D. Additional crosstalk determinations are made by reversing the line positions (AB and CD) with respect to the measuring equipment. This will provide four sets each of far-end and near-end crosstalk readings.

The readings in each group will probably differ in value. The highest crosstalk reading, near-end or far-end, indicates the worst crosstalk condition that is likely to be obtained by having two systems operate in the same open-wire lead.

It is obvious that carrier channels of the same high

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While we don't claim to have all the answers, we'll welcome the opportunity to discuss as many as possible in our columns.

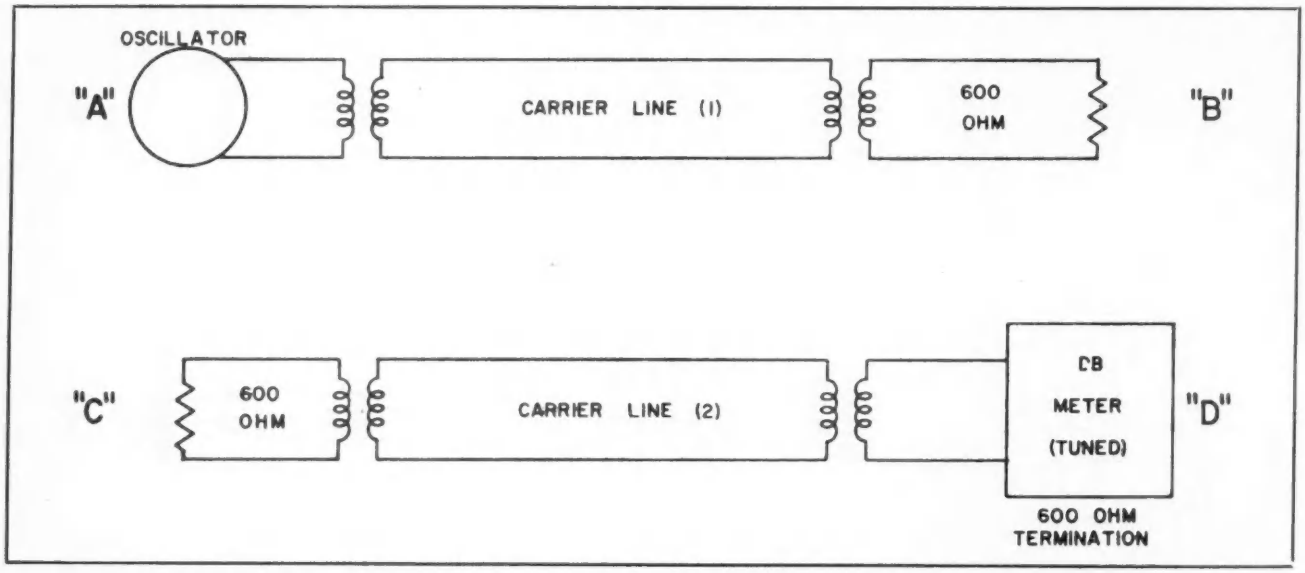


FIGURE 13: — Arrangement for measuring far-end crosstalk between two carrier circuits.

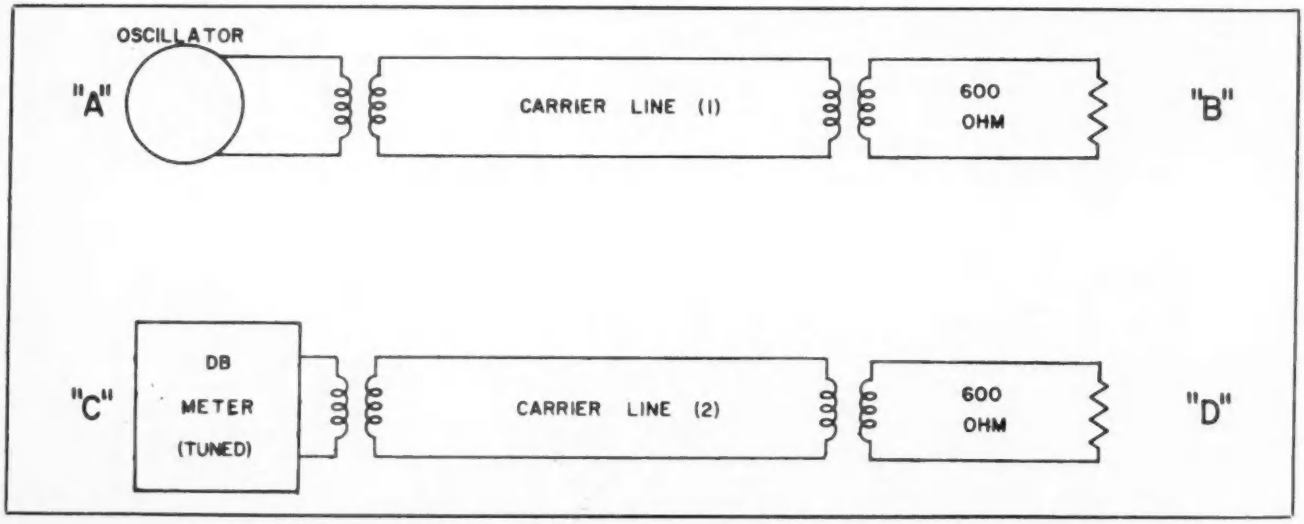
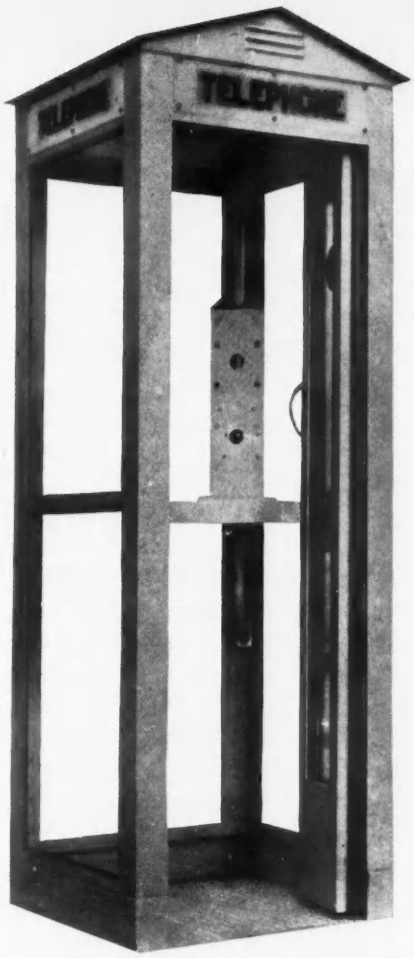


FIGURE 14: — Method of measuring near-end crosstalk between two carrier circuits.



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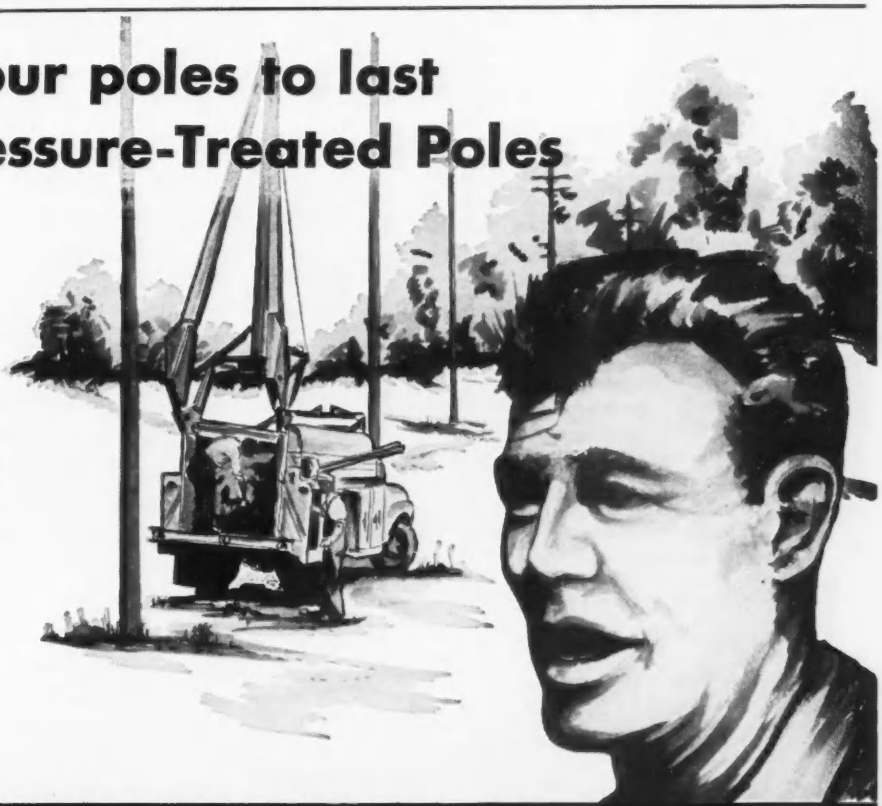

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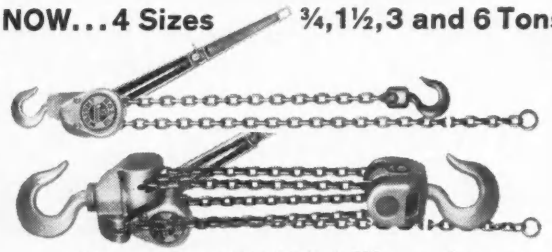

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frequency value cannot operate in the same open wire lead. With the proper transposition scheme, lower frequency carriers can be transmitted in the same lead.

Another way by which crosstalk can be minimized is to provide carrier systems with different frequency allocations when several systems are to operate in the same open-wire lead. Typical standard frequency allocations for an FM carrier arrangement are the "A" and "B" types listed below (*Panhandle Electric Sales, Inc.*):

Channel Number	Line Frequencies in Kilocycles "A" Allocations West	"A" Allocations East	"B" Allocations West	"B" Allocations East
1	50	65	57.5	72.5
2	80	95	87.5	102.5
3	110	125	117.5	132.5
4	140	155	147.5	162.5
5	170	185	177.5	192.5
6	200	215	207.5	222.5
7	230	245	237.5	252.5
8	260	275	267.5	282.5
9	290	305	297.5	312.5
10	320	335	327.5	342.5

In using carrier systems of these two allocations listed above, the manufacturer specifies that the near-end crosstalk must be down to a value at least equal to the line attenuation, plus 25 db.

For example, if the line attenuation reads —15 db at a particular channel frequency, then for satisfactory operation, the near-end crosstalk at the frequency must be down —40 db or more.

Line Conditions Affecting Subscriber Carrier Operation

LINE TRANSPOSITIONS have an important effect upon both line attenuation and cross-talk. The transposition scheme is designed to improve these factors for a specific purpose and over a specific range, usually to the detriment of other frequencies. The transmission test will indicate if retransposition of the line is required.

The impedance mismatch at the junction of the open-wire and cable will cause approximately 3 db loss. This can be corrected by insertion of impedance matching transformers at the junction of cable to open-wire. The transformers obviously must be capable of handling the carrier frequencies used.

As previously pointed out, carrier currents are seriously affected by corrosion in line splices. No twisted splices should be permitted unless they are properly soldered. Splices of copper or copper-steel to steel wire should be made with the special splicing sleeves designed for this application. For copper-to-copper and steel-to-steel splices, standard compression sleeves will do the job.

When heavy induction is present on the voice-frequency line connected to the carrier terminal, it will be necessary to limit the induction to a safe level so that the power dissipated in the line relay of the carrier terminal will not be excessive. A longitudinal choke coil inserted in the voice-frequency line near the carrier terminal will limit the current from the induction. — *To Be Continued.*

EDITOR'S NOTE: — *If you missed Chapters One and Two of Mr. Reed's article on "Subscriber Carrier Systems" write for tear sheets.*

New Products' Showcase

SUPPLIES AND EQUIPMENT

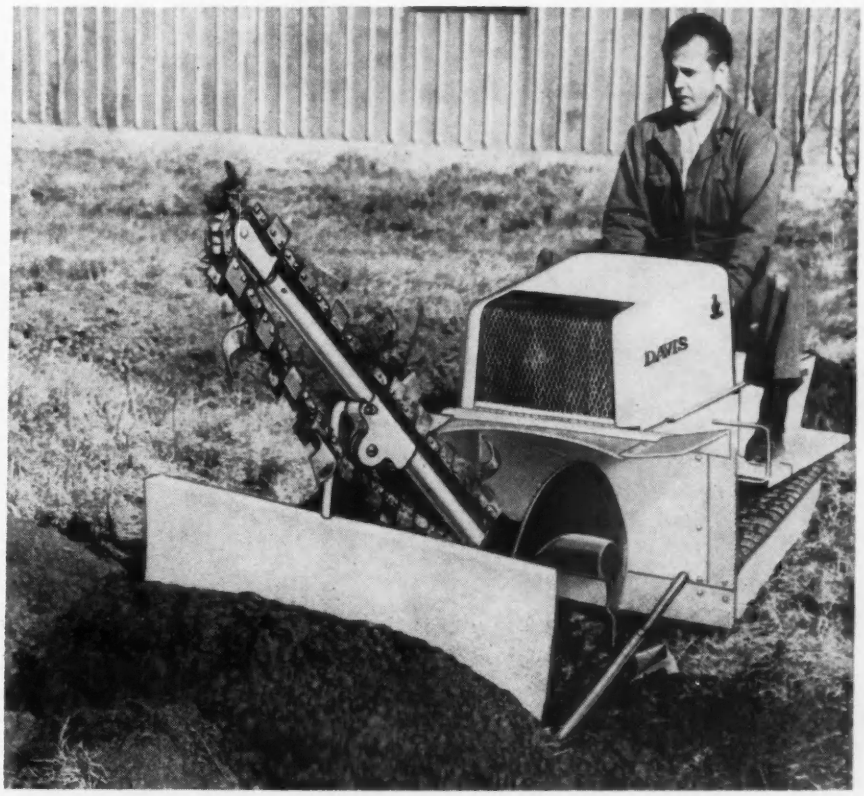
By DICK REYNOLDS

Davis Trencher

EQUIPPED with its own backfill blade the 1960 Davis T-66 Trencher handles its own backfilling assignments. The new backfill blade can be raised or lowered hydraulically and can be set straight or angled to the left by a pin setting.

Independent drive clutches and disc steering brakes are provided for each track, and the rig provides instant forward or reverse for immediate change of direction. This gives maximum maneuverability and easy operation during backfilling operation. Digging to 66-inch depths is possible in 3 to 4-inch widths. At a foot wide, the Davis T-66 Trencher goes to 30 inches deep, and at varying widths and depths in between.

The Davis rig provides a boom extension with built-in shock absorber that cushions shock without absorbing power. The hydraulically operated standard boom telescopes from 26 to 40 inches for digging to a 40-inch maximum depth. With an extra equipment telescoping extension, the rig is adjustable for the 54 to 66-inch depth. *Check NP* 457.



1960 Davis T-66 Trencher handles its own backfilling requirements.

Davis Utility Trailer

THE NEW Davis Hustler Utility Trailer with tilting deck has been announced by Davis Mfg. Inc. Designed to carry the new Davis T-66 Self-Propelled Trencher pictured above, and is also adapted for a wide variety of other transporting jobs. Ribbed

channel tracks with locking ends are available for hauling the T-66. Also available are 10½-inch high steel removable sides with tie-down bolts.

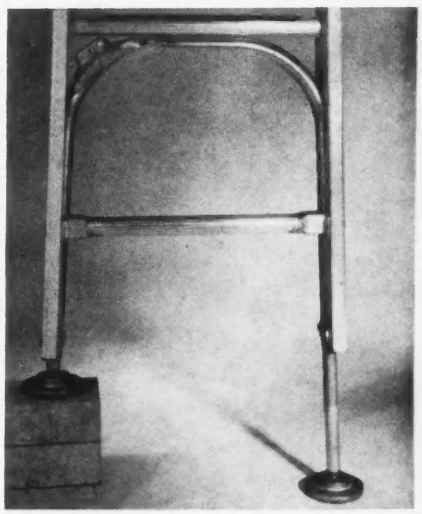
The Hustler pulls easily behind a car, is readily maneuverable for safe pulling on residential streets and into home driveways. Featuring 2,000-pound capacity on a deck 4′ wide and 7′ long, it has a patented Prior-Linco axle with torsion springs to provide low center of gravity and load equalization regardless of distribution of the load weight.

Standard features include high-speed 6.40 x 15.00, 4-ply tires. The Hustler is of all-steel, welded construction. *Check NP* 458.

Ladder Equalizer

A LADDER equalizer has recently been announced by Hopfeld Industrial Manufacturing Company which fits into the base of a ladder. Two base legs adjust themselves vertically (up to a 9½″ differential) to irregular surfaces, slopes or steps by placing the ladder in position for use. The device then locks automatically when the ladder is stepped on.

The equalizer locks at three points where steel bears upon steel. By re-



moving weight from the ladder, the equalizer legs, with their ball and

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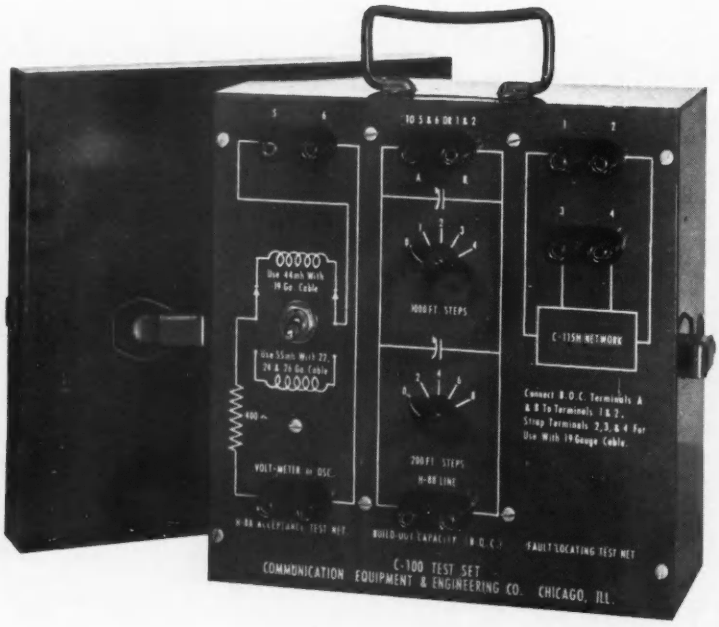

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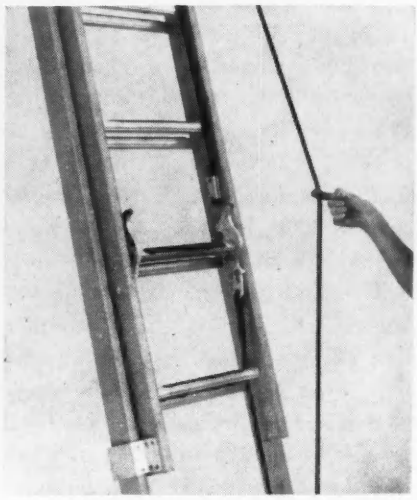
socket non-skid feet, are then free to adjust to another contour. The unit is completely sealed in and self lubricating. *Check NP* 459.

Fiberglass Safety Ladder

THE HIMCO light-weight fiberglass safety ladder has recently been standardized for volume production by Hopfeld Industrial Manufacturing Company.

The ladders rails are constructed of fiberglass-plastic channels which are bonded around a hardwood core. They are also electrically non-conductive. The fiberglass surface is



splinter-proof, impervious to water, paint and solvents, and resistant to scratches, acids, alkalis, and other corrosive chemicals.

A feature of the ladder is the safety lock and "endless" rope. The rope is made of polypropylene, which will support 3,000 lbs., will not stretch or shrink, and is resistant to corrosive chemicals. *Check NP* 460.

Alarm System

AS MANY as 480 functions in a microwave system can be monitored through a new alarm and fault finding system developed by Motorola, Inc. The new MA-1 system indicates station condition, overall system conditions, and individual function condition.

The system consists of a Master Alarm Station and a series of reporting stations. It can accommodate 24 stations with up to 20 functions at each.

The Master Alarm Station, which

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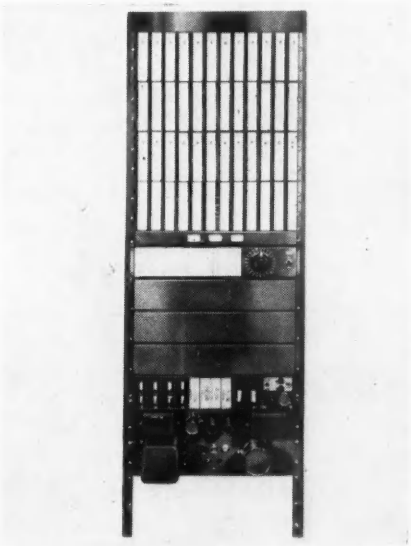
can be located at any RF station, includes an indicator panel with one or two modules for each station in the system, an alarm panel, coding and decoding chassis, and a tone transmitter and receiver unit.



No multiplex equipment is needed for either Master Station or reporting units. If more than one Master Station is utilized, alarms will be reported simultaneously at each one. *Check NP* 461.

Carrier Repeater

THE LEVELS of telephone carrier channels may now be boosted individually as the result of the development of a new type of carrier repeater announced by Budelman Electronics Corp. The repeater, which is inserted in the line, provides up to 25 db gain in both directions. One repeater is used for each channel requiring increased gain. Other on-line signals are by-passed around the repeater.

The repeater delivers up to 16 dbm in both directions and is designed to match 600-ohm open wire lines; output is continuously variable. Bandpass filters in both input and output circuits provide approximately 120 db of level separation between adjacent channels. Type 26 carrier repeaters are available for operation with Budelman 10-kc spaced carriers operating in the 10-200 kc range, and for Budelman 12-kc spaced carriers operating in the 12-96 kc range. Models are available for operation from office battery (0.2 amps per repeater) or a-c (10 watts per repeater). Each repeater occupies 3½ inches of rack space. *Check NP* 462.

Power Amplifier

A 2 KILOWATT RF klystron power amplifier has been developed by Sierra Electronic Corporation.

Four VA-856 klystron tubes are used to give the Model 210A amplifier a range of 7.125 KMC to 8.5 KMC. It has a gain in excess of 40 db when operated as a broadband amplifier. Other versions of the Model 210A can be provided to cover the frequency ranges of 5.875 to 6.425 KMC or from 8.0 to 10.8 KMC.

With the exception of the heat exchanger, all circuitry in the Model 210A is centralized in one cabinet with front and rear access doors for easy servicing. All operating controls are on the front panel for left-to-right operating sequence. Maximum bandwidths at the ½ power points are 15 MC, staggered tuned, and 10 MC synchronously tuned.

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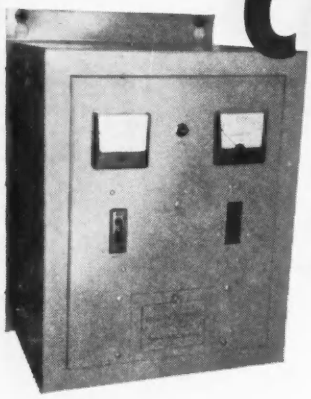

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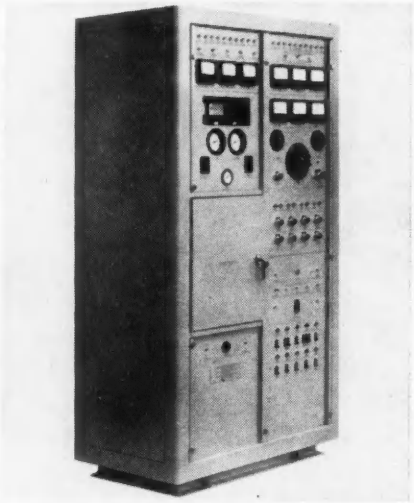
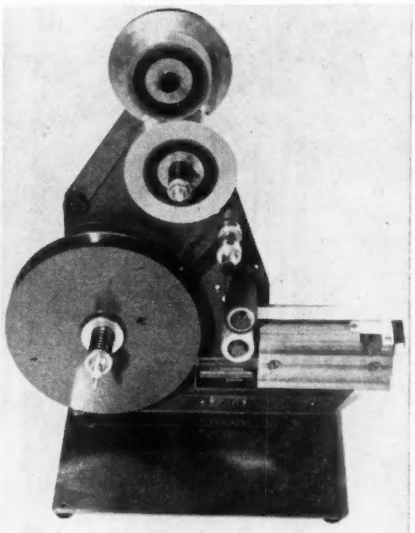


and 27″ deep. The separate heat exchanger weighs 500 pounds and measures 33½″ high, 25½″ wide and 42″ deep. *Check NP* 463.

Insulation Laminator

A LAMINATOR designed to make electrical insulation pressure-sensitive on the production line has been announced by Minnesota Mining and Manufacturing Co.

The laminator features feed spools for double-coated tape and the insul-



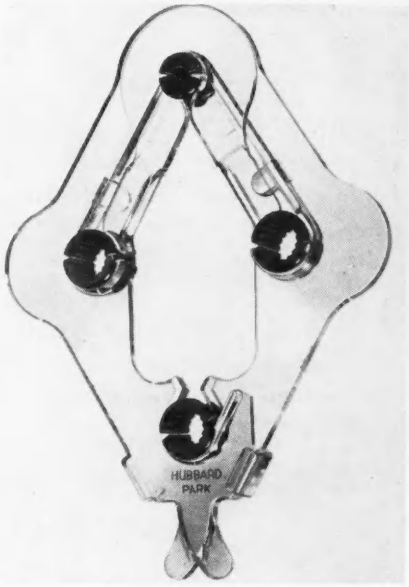
ating material, with a take-up spool for the tape separation liner. The tape and insulation are laminated together as they are removed from the dispenser. *Check NP* 464.

Adjustable Phase Fitting

A PHASE fitting that will adjust to normal variations in crossarm

spacing on double arm transmission structures, as well as to all standard arm sizes, is now available from Hubbard & Company.

The adjustable phase fitting can be locked in five different positions to provide spacings from 8½″ to



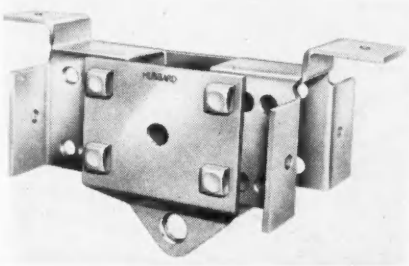
12½″ in one inch steps. They are formed from ¼″ steel plate, hot galvanized, and provide the strength of an integral unit once the assembly bolts are tightened.

Variations in pole sizes are easily accommodated with one size spacer. "V" brace and insulator string attachment holes are provided. *NP* 465.

Plexiglas Spacer

A PLEXIGLAS aerial cable spacer, called the Hubbard-Park, has been introduced by Hubbard & Company. The spacer surrounds the cables and messenger, and spaces them on 6″ centers.

Polyethylene grommets are slipped on to the various wires, which then



can be installed in the opened spacer. After the conductors and messenger are snapped into place, closing the spacer automatically locks the assembly into an integral unit. *NP* 466.

Transite's installed cost is less because your crews spend virtually all of their time with the actual installation of duct.

Now–save 5¢...10¢... up to 15¢ per duct foot!

Here's why Transite Telephone Ducts offer these substantial savings in installed cost!

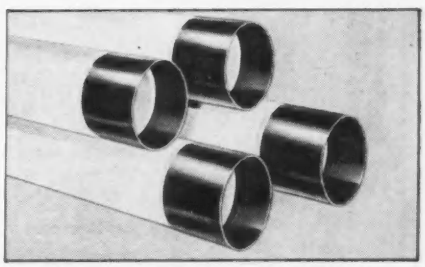
In virtually every part of the nation installations of Transite® Telephone Ducts are at a new high!

Why? For the simple reason that no other material offers so many practical advantages . . . with each contributing to lower *installed* costs. In fact, savings can run as high as 15¢ per duct foot!

With Transite you're working faster, easier . . . with smaller crews. For there's no complex joining and difficult positioning. Instead, the 10′ Transite lengths are easily handled by one man. And the plastic coupling used with Transite makes a tight joint that goes together in seconds . . . stays tight for the life of the line.

More time and labor are saved in splaying...curving...bypassing...and in manhole connections! Every one of these on-the-job requirements is met with a minimum of "extra" in time and material.

With Transite you have fewer items to stock, less warehousing, lower inventory costs. There's less handling of material all around. As for breakage, there's practically none. Savings are substantial.



Write today for brochure TR-239A, "Transite Telephone Ducts." It gives complete information on why Transite's installed cost is lower . . . as well as why it reduces future costs in cleaning, rodding and repair. Address Johns-Manville, Box 14, New York 16, N. Y. In Canada, Port Credit, Ont.

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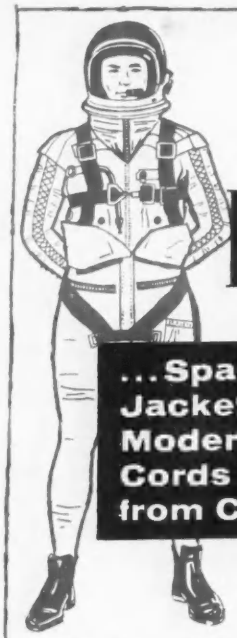

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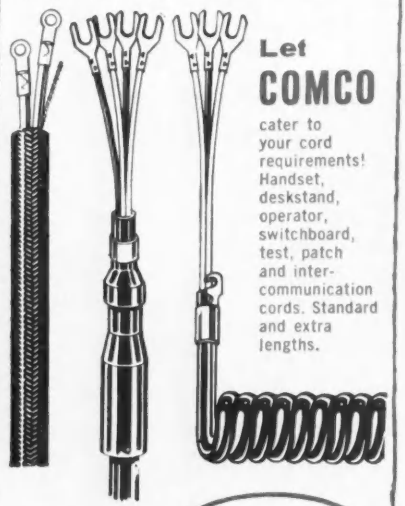
Today's and tomorrow's demands on your system calls for ever tougher, more durable and trouble free equipment. In cords, that's P.V.C. from COMCO,

Superior to Neoprene in toughness and crack resistance, this P.V.C. (Poly-Vinyl-Chloride) jacketing has other advantages, too. Jacket's smoother inner surface permits conductors to flex freely . . . eliminates binding and fracturing —thus assuring longer noise-free life.

P.V.C. jackets are standard on all COMCO straight cords and Spiraflex Rectractile Cords . . . choice of black or ten colors.



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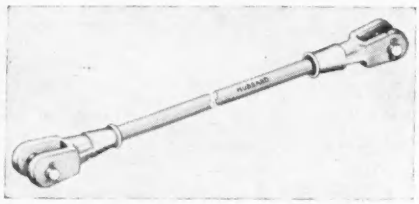
Strain Insulators

HUBBARD & Company offers a new line of strain insulators made of fiber glass. The fiber glass used makes the insulators lighter in weight, impervious to decay, and moisture-proof. No arcing horns are necessary with these new strain insulators.

Insulation values are permanently maintained at a high level and the

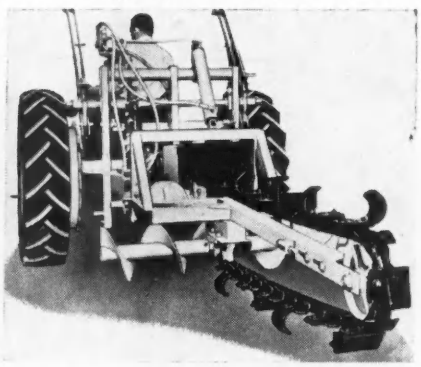


glass like surface is self-cleaning. All insulators pass a 30,000 lb. tension test before shipment. Special insulator lengths and attachment accessories are available. *Check NP* 467.

Pow-R-Ditcher

THE VERMEER Manufacturing Company has recently announced a new ditcher designed to fit all 3-point tractor hitches.

The Vermeer 3P Pow-R-Ditcher has a digging width of 6″ to 16″



wide and will dig to a 4½′ depth. The digging chain is the same as used on the largest Vermeer Pow-R-Ditchers. The ditcher has a hydraulic actuated travel ratchet device that gives full control of digging speed from one control lever. The power is taken from the tractors hydraulic system. The PTO shaft is equipped with a double disc friction slip clutch for digging safety. *Check NP* 468.

Data Transceiver

A HIGH SPEED binary data transceiver has been developed by Stromberg-Carlson Co. The new transceiver, which uses solid-state circuitry, is known as the Model S-C 301.

The high speed of data transmission is made possible by a modulation method which minimizes errors

due to impulse noise, phase distortion, frequency translation and other transmission problems normally encountered on wire line facilities.

The input signal may be either polar or impulse type binary information. The transceiver accepts the data in the form of a serial train of pulses, shapes the pulses, and modulates a subcarrier frequency. No sychronizing signals are required, as the receiver portion of the transceiver has an automatic frequency control system for automatic synchronization at any bit frequency between 2350 and 2450 pulses per second. *NP* 469.

NEW PRODUCTS' DEPARTMENT **6-15-60**
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Please send me additional information concerning the following new products:

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NP 462..... NP 463..... NP 464..... NP 465..... NP466.....
NP 467..... NP 468..... NP 469.....

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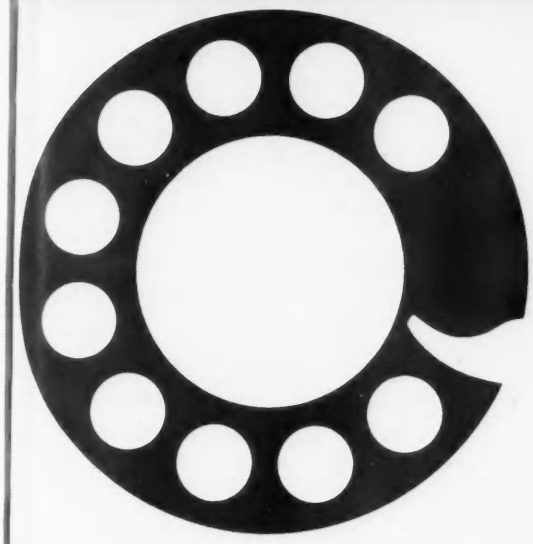
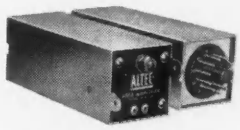
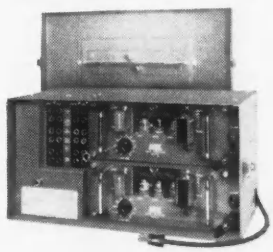
GET ON THE ALTEC LINE—for improved telephone equipment



The best number in your book—the one that connects you with the Altec line. For performance, reliability, and servicing ease, the Altec line of amplifiers and equipment have won a resounding vote of confidence from the industry. Precision-engineered to meet your most exacting specifications, Altec products offer the improved design that makes maximum use of minimum space—and the "plus" that makes the difference—Altec quality.



The 455A Amplifier is a transistorized repeater type amplifier wrapping up a compact package of gain for telephone circuit use. Incorporates the gain, power handling capacity, frequency response, plug-in features in the physical size of vacuum tube type repeater. Ten repeaters go in the same standard rack mount used for vacuum tube types. Operates on 48 volt DC @ 22 ma. Since it is transistorized no 130 volt supply is needed. For details, write for Altec Lansing Bulletin #13385.



The S-17 Amplifier System is designed for the highest quality program transmission over telephone circuits. A single portable and rack-mountable housing contains two (2) amplifiers and accessory jacks and equalizers so that two (2) complete circuits can be maintained without cross talk. Write for Bulletin #12835.

For complete information about Altec telephone and paging equipment write to the address below or call PRospect 4-2900 in Anaheim or ALgonquin 5-3636 in New York.

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"Not According To Spec"

(Continued from page 46)

Nothing in the way of telephone apparatus was safe, anywhere. In apartment building lobbies, telephone receivers and cords were stolen as fast as they could be replaced. One day in the Seattle main exchange, the wire chief sobbed to me that he was losing as many as 15 complete operators' sets in a day, transmitters, plugs n' everything — "and they are not the faintest bit of use to anyone for making a crystal set!" It was an amusing boom; and I longed to ask those prophetic engineers what they thought about it.

Even the Bell System planning staffs, with all their remarkable machinery for gleaning and weighing information, can go hilariously off the beam when they soar into the future. Once I was shown the forecast projections of a certain Bell operating company, made circa 1927, on the basis of which millions were spent in new construction. They indicated continuous undeviating progress for a decade ahead. They were utterly blind to the coming crash!

Again, before V.J. Day in 1945, the wisest Merlins in our entire industry predicted that the end of the war would bring about a sharp reduction in long distance telephone traffic! Prophesy is a hazardous occupation in our business! — *To be Continued in a future issue of "Telephone Engineer & Management."*

Book Review

IN ORDER to reduce to a minimum the number of frequencies at which acoustical measurements need to be tabulated, a new American Standard, Preferred Frequencies for Acoustical Measurements, S1.6-1959, has been approved. This new standard refers all frequency-series to a single reference frequency, and selects others in such a way as to afford a maximum number of frequencies common to the various series. Eleven preferred frequencies are cited from 16 to 16,000 cycles per second.

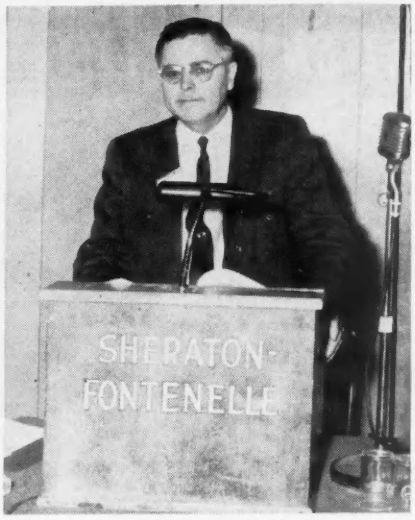
This American Standard also permits certain economies in manufacturing, since equipment can be constructed specifically for these frequencies and graph paper can be printed in advance.

The standard deals with the geometric series formed by test frequencies through the adoption of a constant percentage-increment. It applies to the fields of physical acoustics, including architectural acoustics, electroacoustics, sonics and ultrasonics, and underwater sound, but excludes these aspects which pertain to safety, tolerance, and comfort. It is not concerned with frequency for music.

Copies of American Standard, Preferred Frequencies for Acoustical Measurements, S1.6-1959, are available at 35 cents each from the American Standards Association, Dept. PR 140, 10 East 40th Street, New York 16, New York.

USITA President FOSTER McHENRY, Jefferson City, Mo., was a featured speaker at recent convention of the Nebraska Telephone Association.

JOSEPH BROWN, chairman of the Nebraska State Railway Commission, addresses 60th annual convention of the Nebraska Telephone Association.



J. E. NELSON, secretary-treasurer of the Nebraska Telephone Association, presents his annual report at recent Nebraska convention.

Nebraska Commission Chairman Stresses Need For Sound Financial Structure

IT IS IN the public interest that a utility company be sure that it has the financial ability to meet public demands for service as they are thrust upon them," Nebraska State Railway Commission Chairman J. J. Brown declared in an address to the Nebraska Telephone Association's 60th annual convention in Omaha.

Chairman Brown also strongly attacked the excise tax on telephone service. He said the Nebraska commission members "strongly feel that the most inequitable feature of the entire existing tax structure is the 10% tax applied to telephone service and transportation . . . It is unthinkable that this excise tax on telephone service be continued indefinitely."

Referring to recent proposals by some government officials at the state level that the states impose a telephone excise tax if the federal levy should be terminated, Brown expressed the view that "Only a few people are talking about transferring this 10 per cent sales tax to the states, with the thought, no doubt, of perpetuating this discrimination indefinitely. What other service or commodity do we know of that is burdened with a 10 per cent sales tax by a state today? There is none, I am sure. Nor is there any reasonable basis to single out telephone service for such unfair treatment."

In discussing the need for a public utility to have a sound financial structure, Chairman Brown said this means "you must carefully keep your credit good. You must have funds available or be able to raise capital when you need it. Similarly, you must plan ahead for necessary central office or outside plant extensions so that facilities are readily obtainable when customers require them. Experience has shown that a good credit risk, with a satisfactory history as to financial and earnings results, assists materially in lowering the cost of new capital. In the final analysis, this works to the benefit of the consumers."

JAMES B. MOORE, vice president and general manager, Northwestern Bell Telephone Co., Omaha, Neb., delivered keynote address at recent Nebraska convention.

He added that another responsibility of utility company management "not yet as fully or widely appreciated as it should be" is that plant construction should be handled for the best long-term operational result. "Real savings are available in plant installations to those companies that are wise enough to plan ahead for future customer needs," Brown declared.

The keynote speaker at the annual convention, James B. Moore, vice president and general manager in Nebraska for the Northwestern Bell Telephone Co., foresaw the 1960's as "growing and successful years for the telephone business," but at the same time cautioned that inflation and some other economic factors loom ahead that threaten to spoil the nation's prosperity.

In discussing the future, Moore stated, "I doubt that this new decade is going to provide any automatic answers for a lot of problems which have been growing in the 50's and which will only become worse unless we can find far better solutions for them than we have managed to find so far."

Expressing his belief that the only way to make more dollars is to produce something that can be sold at

a profit and which in turn can justify putting more people to work at wages, Moore concluded, "This will depend on how willing we are to accept the responsibilities that go along with being effective citizens of a democracy. Our people, young and old, are going to have to learn that they must stand up and be counted on some important things, that they will have to be against some things hardly anyone has been against for a long time.

"We shall have to recognize that no level of government can spend or give away a dollar that it doesn't first collect from us. And I feel that we have to develop a far greater recognition that the relationship of this country to the rest of the world has been undergoing a great change in recent years."

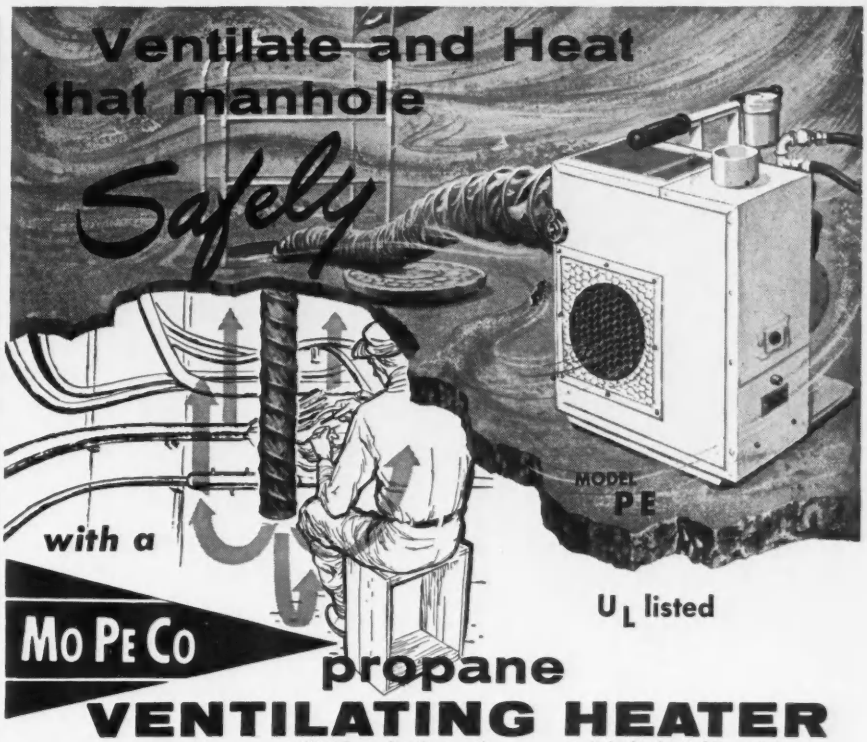
Robert B. Crosby, former governor of Nebraska, told the Nebraska convention, "The idea of an individual attacking business, with the idea of sticking up for the little people, is a shame, for it is the little people that make up business, whether they are employers or employes."

"Our state and federal governments need two strong parties," he emphasized, "and it is part of every citizen's civic duty to participate in politics, whether Democrat or Republican, just as important as your work and family . . . none can be neglected," he said.

Stating that "Every organized group should participate in the shaping of the path government should take . . . for what we shape in government now will have a detailed effect on our children," Crosby warned, "Now is the time for business to participate in politics; for participation will form the destiny of the future generations."

U.S.I.T.A. President Foster McHenry, Jefferson City, Mo., addressed the second general session of the Nebraska convention and told the conventioners the decade "on which we are now embarking will require more stations, more plant facilities, more money for investment purposes and many more technical advances."

"The brightest years and largest opportunities lie ahead of us," he



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NATCO CLAY CONDUIT, economical to install and maintain, is the low cost way to give Underground Telephone Cables permanent protection. Available in a full line of shapes.

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PENTA treated top-to-butt for years of added pole-line service resulting in far less per annum costs. Dependable service by a company who has been serving telephone companies for more than 50 years.
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said. "Our population now is somewhere near 179 million. It is estimated that by 1980 there will be 77 million more people in the United States. All of this points up the need for things we must have if we are going to prove equal to our opportunities."

Emphasizing that the telephone industry must recruit a greater number of young people who will be interested in the communications industry, McHenry stated, "We must have more technical trainees to cope with new and presently unknown problems. We must have more people and higher trainee standards for executives, management and supervisory positions.

Addressing the convention's third general session, Fred A. Herrington, executive director of the Nebraska Citizens Council, formerly Nebraska State Tax Commissioner, stated he "is appalled at the lack of interest individuals have in the formation of the tax structure of their state."

"Lack of participation in legislative hearings and the ineffectiveness of lobbyists, who do not carry the weight that individuals do, singly or in groups, during the legislative year cause many unneeded laws," he said.

Predicting that 1961 is going to be a year of important tax legislation, Herrington asked, "Is it right, then, that only a handful of Nebraskans will control the kind of legislation and determine the amount of spending?"

"These individuals represent a lot of people," he said, "but unless they represent you and your point of view, you are going to be out in the cold. I am convinced that unless more people are willing to speak up publicly, those who feel that our system is a 'mess' are going to continue to get 'more of the same'."

Officers elected during the three-day meeting are: President Jack Dwyer, manager of the Hartington Telephone Co.; Vice President LeRoy Sieckmeyer of the Blair Telephone Co.; and Secretary-Treasurer J. E. Nelson of Lincoln.

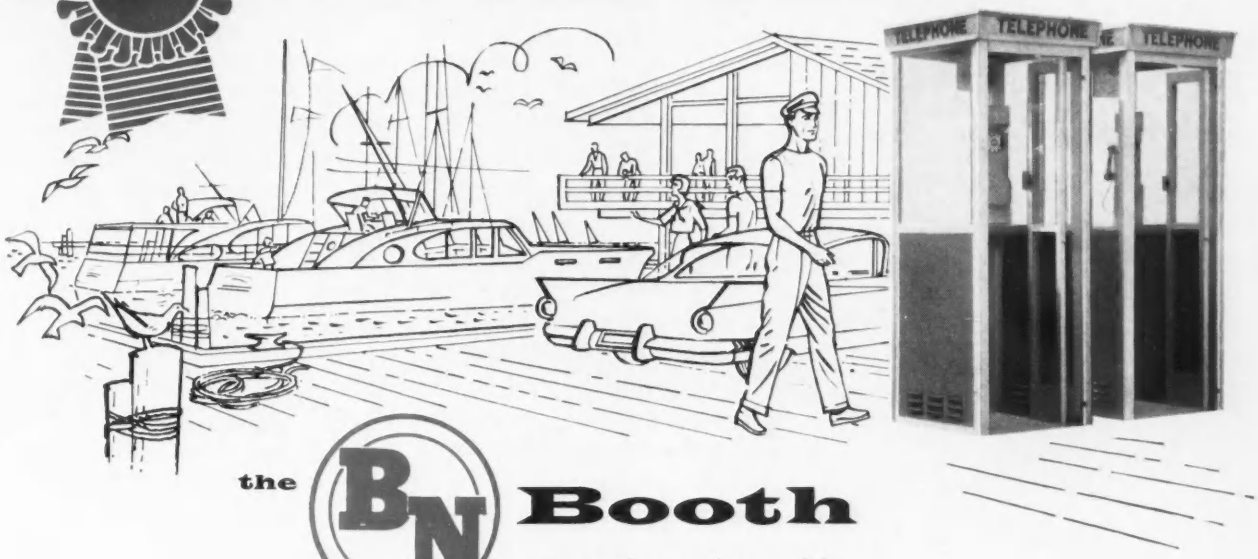
Directors of the Nebraska association are: Neil N. Young, Cozad; J. L. Antrim, Scottsbluff; Clifford Thompson, Dunning; Ben Wagner, Blue Hill; John Ahlstrand, Omaha; Pat Carey, Petersburg; Harold Lang, Hay Springs; Kenneth Werner, Chambers; K. L. Lawson, Lincoln; and J. L. Van Horn, Grinnell, Iowa.

L. H. Meyer Named Pres., Indiana Telephone Assoc.

MEMBERS of the telephone industry who attended the 1960 convention of the Indiana Telephone

W. J. SCHEIDLER, Greensburg, president, Public Telephone Corp., receives the 1960 Indiana Telephone Man of the Year Award from C. D. EHINGER, Decatur, president, Citizens Telephone Co.

BEST PROVED for yacht harbors



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attracts the eye day or night
promotes more revenue. Colorful, clean, sturdy –
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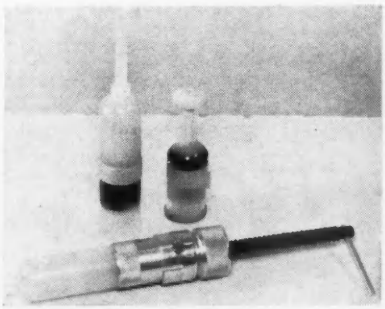
NEW PRESSURIZED CABLE DAMMING METHOD



The introduction of Semco Sales & Service, Inc., two-part SemKit, has eliminated the problems of mixing and applying resin to pressurized cables. Eliminates incorrect proportioning from one container to another for the mixing operation. Material after mixing will not contaminate the applicating gun.

Mixing of the SemKit is done by:

1. Removing tape Clinch band from cartridge.
2. Pulling dasher rod to neck of cartridge.
3. Deforming the foil barrier to combine base and activator for mixing.
4. Rotate Dasher assembly in a clockwise motion until material is completely mixed
5. Pull dasher rod to neck of cartridge and remove.
6. Place cartridge in 755 Screw Gun for application.

APPLICATION OF THE RESIN

Place mixed cartridge into 755 screw gun and lock in place with stainless steel retainer screw in fitting from cartridge to injection fitting and apply.
After application remove cartridge from gun and discard.

No cleanup of gun.

No contact with the resin.

No possible chance of skin contact with the resin.

No clean up of personnel.

Patent No. 2,838,210, Others Pending

Numerous operating telephone companies are now using this method of application. Better application methods reduce costs.

For further information contact:

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PLASTIC COATED

Chance Pike Poles are sealed in Maplac* a tough transparent plastic that increases pole life—protects against warping and splintering.

*Trade Name

LAMINATED

Poles are of laminated construction, with wood grains carefully glued at cross angles for greater rigidity and warp resistance.

STEEL BUTT RING

Every Chance Pike Pole is reinforced at the butt end with a heavy steel ring . . . guards against chipping and splintering.

TWO SIZES . . . Chance Pike Poles are available in 2″ and 2¼″ diameter sizes . . . in a variety of lengths.

CT58-11

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Association at the Claypool Hotel, Indianapolis, heard a variety of speakers. W. H. Eells, Cleveland, Ohio, regional manager, Civic and Governmental Affairs of the Ford Motor Co., addressed the convention luncheon on the subject: "A Businessman's Approach to Politics."

In part Eells said: "Businessmen must take an active part in politics to promote sound government if the free enterprise system of business is to survive. The American businessman has been the scapegoat of unrelentless attacks on his right to be a first class participant in politics."

Eells cited three reasons why the businessman must enter politics:

(1) Increased taxes and legislation affecting business are choking many businesses.

(2) Organized labor has developed much political influence and business must keep pace.

"This must not, however, become on the part of business an anti-labor movement," he warned. "Business should act positively with an interest in improving the quality of government. Government needs good leaders and business can provide them," he declared.

Members and heads of departments of the Public Service Commission of Indiana were luncheon guests.

At the Thursday morning session, Robert S. Webb, chairman, Public Service Commission of Indiana paid tribute to the role which Indiana telephone companies and other utilities had played in providing service to keep pace with the tremendous industrial growth in Indiana. He stressed that rates would have to be fair to utilities to permit them an adequate income to provide better and expanded services.

Four panel sessions were presented at the morning session on the first day's program. Chairmen of the sessions were: Accounting: LaMar S. Stoops, Nappanee Telephone Co.; Commercial: Harry Purcell, Jr., Ohio River Telephone Co.; Plant: Virl A. Watkins, Princeton Telephone Co.; Traffic: Jack C. Cluen, United Telephone Company of Indiana, Inc.

Roger D. Branigin, Sr., Lafayette attorney and a member of the Board of Directors of General Telephone Company of Indiana, Inc., was the dinner speaker. W. J. Scheidler, Greensburg, president, Public Telephone Corp., received the Telephone Man of the Year Award, and James C. Graham, Indianapolis, an installer for Indiana Bell Telephone Co., received the Association Merit Award for heroic action in saving the life of a 4-year old girl.

A Certificate of Merit was awarded to C. D. Ehinger, president of Citizens Telephone Co., Decatur, for his two years of service as association president.

Other highlights of the convention included a safety film on Rescue Breathing; an address by Association

Association President C. D. EHINGER, Decatur, reads citation naming JAMES C. GRAHAM, Indiana Bell Telephone Co., Indianapolis, winner of the 1960 Association Merit Award for saving the life of a 4-year-old girl.

President C. D. Ehinger and the annual report of the secretary-treasurer, George A. Schumacher. A memorial resolution was adopted to the memory of the late Ralph F. Lucier. Official convention registration totaled 445 persons.

New association directors elected are: Roy C. Echols, Indianapolis, president, Indiana Bell Telephone Co.; and Don Van Fleit, president, Garrett Telephone Co.

Directors reelected are: John A. Harbaugh, president, Sullivan Telephone Co.; R. R. Hirschman, assistant vice president, Indiana Bell Telephone Co.; and Francis Simpson, Winchester, executive vice-president, The Eastern Indiana Telephone Co.

At the director's meeting following the convention the following officers were elected: President L. H. Meyer, Fort Wayne, president, General Telephone Co. of Indiana, Inc.; 1st Vice President G. A. Steele, Warsaw, president, United Telephone Co. of Indiana, Inc.; and 2nd Vice President Clark Mull, Knightsown, manager, Knightstown Telephone Co. George A. Schumacher, Indianapolis, was reelected secretary-treasurer.

Roy C. Echols Elected Indiana Bell President

ROY C. ECHOLS, a former Indianapolis resident and most recently an American Telephone & Telegraph Company vice president, has been elected president of the Indiana Bell Telephone Co., and named a director of the company.

He became Indiana Bell's sixth president, succeeding Harry S. Hanna. Hanna had reached the company's retirement age, concluding a 38-year telephone career.

Echols had been with AT&T since early in 1958. For almost four years prior to that time, he served as Indiana Bell's vice president and general manager.

Echols has devoted much of his lifetime to the telephone business, beginning 40 years ago as a part-time clerk for Southwestern Bell Telephone Co., Dallas, Texas. He worked in the company's accounting department while attending Southern Methodist University and later served in

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plant department posts in Texas, Arkansas, Missouri and Oklahoma.

Echols became a Southwestern Bell assistant vice president in St. Louis in 1949 and Oklahoma general manager in 1950. He came to Indiana Bell from Oklahoma City in mid-1954 to direct the local company's operating departments.

In 1958, he was transferred to AT&T — as an assistant vice president, and, for the past year, he served as vice president in charge of the operations department.

Mr. Echols is a native Texan and was born in Hubbard City on April 22, 1903. He and Mrs. Echols have one child, a married daughter.

Elyria Telephone Co. Advances C. C. May

CHRISTOPHER C. MAY, who received his early telephone training in the communications division of The British Post Office, has been appointed commercial sales engineer in the recently established commercial sales department of The Elyria (Ohio) Telephone Co.

May came to the Elyria company from England in October, 1953 and has filled several positions in the plant department.

May joined The British Post Office in 1945 and served eight years. He spent two years in the British army in Japan. He was a telephone engineer when he decided to come to America.

May will report to another English born employe of The Elyria Telephone Co., Ronald Tayler, general commercial representative who has been with the Elyria company for eight years. The new department will work with industrial and business users of telephone service analyzing their requirements and planning equipment to meet their particular needs.

Naylor Named Commercial Supt. for Calif. Water & Tel.

JAMES T. NAYLOR, employed by California Water & Telephone Co. in 1953 as study engineer, was recently named Telephone Division commercial superintendent.

Naylor replaces Mrs. Lucile Con-

over, who requested that she be relieved of some of the additional responsibilities brought about by the rapid growth of California Water & Telephone Co. and the consequent expansion of activities within the commercial department. Mrs. Conover's new title will be commercial operations superintendent.

The new commercial superintendent was born in Huntington Beach, Calif., on January 21, 1924 and was graduated from the University of Southern California in June of 1949 with a degree in Industrial Engineering.

Following graduation he was employed by the Western Telephone Co. In January, 1950 he joined the San Joaquin Telephone Co. in Manteca, Calif., as treasurer and assistant manager. He held the position until he joined California Water & Telephone Co. in 1953.

His duties as division study engineer for California Water & Telephone Co. included development of continuing cost studies in support of intercompany settlements for toll service, multiple message unit service, extended and miscellaneous services.

He also serves as the company's representative on the four-company committee which studies settlement problems and procedures connected with the joint offering of multiple message unit service in the Los Angeles extended area.

Western Rural Group Meets at Portland

PRESIDENT Dick Crowe, Dos Palos, Calif., welcomed a gathering representing over 75 REA financed or interested telephone companies and cooperatives operating in the far western states, REA officials from Washington, D. C. and district area personnel, and public service commission staff representatives and sales personnel to the 15th semi-annual meeting of Western Rural Telephone Association, held recently at Portland, Ore.

Ralph J. Foreman, deputy administrator, REA, and Harold F. Clark, assistant western area director, REA-Telephone, were principal speakers.

Foreman stated the REA financed

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commercial companies and cooperatives of the West have a tremendous challenge in fulfilling their obligations in providing modern telephone service to rural communities, farms and ranches. He commended the members of the association for their efforts and position of responsibility in providing this essential service.

Foreman stated the REA advisory committee, which includes Don Dixon of the Project Mutual Telephone Cooperative, Rupert, Idaho, and Jack McGuire of the Central California Telephone Co., Bakersfield, Calif., has been very helpful in furnishing actual operational experience statistics which assist in the preparation of engineering, management and operational instructions. A two-way reporting system has been developed through this committee.

Clark stated 18 per cent of operating revenue should be used for plant maintenance work. Unless this plan is followed, the plant will eventually be in such a deteriorated condition that the loan funds will be in jeopardy.

Glenn J. Stover, president of the National Rural Telephone Association, reported the association is growing and the response in recent months has been overwhelming. According to Stover, the sole purpose of the association is to assist small companies and cooperatives who receive financing from REA.

"Although the NRTA is in no way associated with the National Telephone Committee of REA Borrowers, we do support their cause this year," Stover reported.

Stover said the association does not believe it is good for any company to get involved in too many organizations.

"Our problems are peculiar and are different," he said. "Unless we collectively work on our problems, our respective companies could become jeopardized."

Speakers at the meeting included Kenneth McCaw, McCaw & Co., Aberdeen, Wash.; James De Young, staff engineer, Pacific Telephone of the NW; Ralph McClaskey, equipment superintendent, Skagit Valley Telephone Co., Mt. Vernon, Wash.; O. B. Mathiesen, division sales manager, Pacific Telephone of the NW; and Douglas Gleason, executive director, National REA Telephone Borrowers Committee.

REA personnel attending 15th semi-annual meeting of the Western Rural Telephone Association. Seated (l to r): RICHARD CROWE, president, Western Rural Telephone Association; RALPH FOREMAN, deputy administrator, REA, Washington, D. C.; HAROLD CLARK, assistant area director, REA Telephone, Washington, D. C. Standing (l to r): HAROLD DALBY, REA area accounting, Richmond Beach, Wash.; WAYNE IRWIN, REA area engineering, Turlock, Calif.; RANDY LEON, REA area engineering, Medford, Ore.; CLIFF GOETTING, REA area accounting, Davis, Calif.; JIM BOWLIN, REA area accounting, Salem, Ore.; EARL SISK, REA area engineering, Seattle, Wash.

Officers and directors of the Western Rural Telephone Association. Seated l to r): J. W. DAMON, vice president, Mt. Vernon, Ore.; R. D. CROWE, president, Dos Palos, Calif.; H. MUMAW, secretary, Westport, Wash. Standing (l to r): G. J. STOVER, Mt. Vernon, Wash.; D. DICKSON, Rupert, Idaho; C. GIBBS, Colfax, Calif.; W. GRAEPER, Aurora, Ore.; M. LARSON, Lynden, Wash.; F. ROSS, Parker, Ariz.

Officers elected are President Richard D. Crowe, Dos Palos Telephone Co., Dos Palos, Calif.; Vice President James W. Damon, Oregon Telephone Corp., Mt. Vernon, Ore.; and Secretary Henry Mumaw, Cohassett Beach Telephone Co., Aberdeen, Wash.

Directors are: Richard D. Crowe, Dos Palos, Calif.; James W. Damon, Mt. Vernon, Ore.; Donald Dickson, Rupert, Idaho; Chester Gibbs, Colfax, Calif.; William Graeper, Aurora, Ore.; Milton Larson, Lynden, Wash.; Henry Mumaw, Aberdeen, Wash.; Glenn Stover, Mt. Vernon, Wash.; and Floyd Ross, Parker, Ariz.

The fall meeting of the Western Rural Telephone Association will be in September at Portland, Ore.

Edgar Peske Named Assistant V. P. of A. T. & T.

APPOINTMENT of Edgar Peske as assistant vice president of the AT&T Co. in New York was announced last month. Peske had been assistant vice president of Illinois Bell in its Department of Revenue Requirements and Finance since 1954.

Harlow A. Coxe, assistant director of engineering economics for the

AT&T Company, will be Peske's successor as Illinois Bell assistant vice president.

Peske's new assignment will be business research problems in the AT&T Company's Administration Department. Holder of degrees in economics from the University of Wisconsin and Northwestern University, he first joined Illinois Bell in 1930. From 1943 to 1954, he held a number of positions in Michigan Bell Telephone Co. and the AT&T Company before returning to Illinois Bell.

Coxe attended the University of Pennsylvania and Lafayette University before joining Western Electric Co. in 1923. He was transferred to the Bell Telephone Co. of Pennsylvania as an engineer in 1924 and joined Illinois Bell in 1925. He held a variety of engineering assignments before becoming general staff engineer in 1952. He joined the AT&T Company in 1959.

Snodgrass Named Controller Of General Tel. Co. of Pa.

APPOINTMENT of Leonard W. Snodgrass, Lexington, Ky., as controller of General Telephone Co. of Pennsylvania has been announced by L. F. Shepherd, president. Snodgrass succeeds Robert D. Buzzard, who died April 16.

The new controller has served as controller of General Telephone Co. of Kentucky since 1958. He started his telephone career as an accounting clerk at Grinnell, Iowa, in 1936 with the predecessor of General Telephone Co. of the Midwest, and served as general auditor, controller, assistant controller, assistant secretary, assistant treasurer and director of predecessor companies of General Telephone of Ohio from 1939 to 1958.

Smail Named Pres., United Tel. of Carolinas

UNITED UTILITIES, INC. has announced the resignation of Walter G. Robertson as operating head of the United Telephone Co. of the Carolinas, Inc. effective March 28. Robertson resigned for personal reasons and did not state his plans for the future.

Edwin W. Smail has been elected

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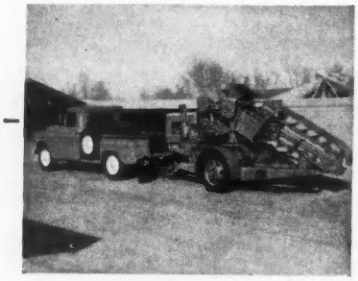
Small in size but heavy-duty in every respect, this 77 has a work range that will surprise you. It opens 4.4 in. to 21 lineal ft. of trench per minute — 6 to 18 in. wide — depths to 5 feet. Positive down-crowd action on telescoping ladder boom starts cut fast — holds accurate grade. Boom undercuts walks, curbs — makes vertical set-ins. Self-cleaning, cast steel buckets are equipped with removable, self-sharpening, point-type teeth. Reversible, power-shift conveyor places spoil bank on either side of trench. See Parsons distributor today, or write for catalog.

Cable installation at this new housing project was put on production line basis! Crumber on 77 Trenchliner was removed, cable-laying attachment installed — and the 77 laid cable as it opened trench.



Transporting the 77 Trenchliner from job to job is fast and easy. No big expensive hauling rig necessary. Conventional tilt-trailer and truck haul it. Only weighs 6800 lbs. Narrow width and low height well within highway clearances.

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president and general manager of the company to succeed Robertson. Prior to his election as president, Smail was assistant general manager.

Smail has been associated with various of the operating companies of the United System and has been with the Carolina company for 10 years. Of this time, several years were spent as commercial and traffic superintendent and a part of this time he served as secretary, assistant general manager and a director.

John Boylan Ill

THE "Dean of Independent Telephony" in New York State, John P. Boylan, is seriously ill in Strong Memorial Hospital, Rochester, N. Y.

Mr. Boylan is the oldest living past-president of New York State Telephone Association and former president and chairman of the board of Rochester Telephone Corp. He was president of the Association from 1932 to 1941, preceded only by Messrs. George R. Fuller (1921-27, deceased in 1929) and Jay George Ihmsen (1927-32, deceased in 1936).

Mr. Boylan is, perhaps, the most widely-known personality in the Independent telephone industry alive today. His entire lifetime business career has been devoted to the industry. A colorful, forceful man, he has written several books and magazine articles covering his experiences in the period of early development of the telephone industry.

A shower of cheerful cards or personal messages would greatly encourage Mr. Boylan. Address them to: Mr. J. P. Boylan, Strong Memorial Hospital, Rochester, N. Y.

Bishop Names Baxter Sales Representative

BISHOP Manufacturing Corp., 10 Canfield Road, Cedar Grove, N. J., has announced the appointment of Andrew H. Baxter, 412 Albee Building, Washington 5, D. C., as the company's sales representative for the state of Maryland, Washington, D. C., and the counties of Loudoun and Fairfax in Virginia.

Baxter will represent Bishop in the sale of synthetic plastic and rubber insulating tapes to electrical utilities,

REA's, the telephone industry and general industry.

"Value Selling" Stressed At Superior Cable Conference

AT A SALES conference held recently at Superior Cable Corp., Hickory, N. C., "value analysis" and "value selling" were introduced as the positive approach to the increasing cost consciousness of industrial management.

James H. Bowman, vice president in charge of sales, pointed out that today's high labor costs and taxes are often beyond the control of industry, and hence the economy target becomes parts and materials. In line with this thinking, more and more buying decisions are being made on the basis of economy at the point of use, rather than solely on original cost.

"Such value analysis," Bowman continued, "puts the purchasing agent squarely on the spot; he must show concrete savings as well as high quality purchases. A supplier that consciously tries to assist the purchasing agent with this value analysis is the company that gets the orders."

Bowman stressed that the salesman who (1) finds ways in which expensive specialties can be replaced by standard items; (2) points out unrealistic specifications; (3) makes sure costly extras are really needed; and (4) questions an order when he has something that may do a better job . . . is the salesman who practices "value selling." This approach cultivates good customer relations by assisting the purchasing agent and industrial management to make value purchases on the basis of value analysis.

Other areas covered during the Superior Cable Sales Conference included a business forecast, competition, products, company policies, and an over-all discussion of sales operations and problems. Thirteen salesmen and company executives attended.

Weaver Jordan Joins Int'l. Teletronics, Inc.

INTERNATIONAL Teletronics, Inc., Dallas, Texas, marketing and distribution organization for Panhandle transistorized carrier products, has announced that Weaver Jordan has been named region manager with headquarters at Warsaw, Ind.

Jordan has had a wide background in the carrier-microwave field. He was first employed by the Setco Division of Stromberg-Carlson Co., Dallas, Texas, as a test technician, and was promoted to supervisor of the department.

When the Dallas, Texas operation was discontinued he was transferred to Rochester, N. Y., and assigned to the carrier-microwave development department. In this capacity he had numerous development assignments on multiplex systems and wire line carrier equipment.

In 1957, he was promoted to the national sales engineering department in Rochester. In this position he handled the application and sales engineering for the Telecommunication product line for all branch officers of Stromberg.

Jordan was later named system coordinator for the larger microwave systems with Stromberg-Carlson. In 1959, he resigned from Stromberg-Carlson to enter private business as a consulting engineer at Hope, Ark.

Altec Lansing Names Badmaieff, Chief Engnr.

ALTEC LANSING CORP., Anaheim, Calif., has announced the appointments of Alexis Badmaieff as chief engineer, acoustics-transducers, and William H. Johnson as manager of engineering and technical information department.

Badmaieff, formerly president of Ultra-Fidelity Labs., Inc. is a fellow in the Audio Engineering Society and holder of 26 patents in the fields of electronics, acoustics, optics and mechanics. He was born in Petrograd, Russia, in 1912, and graduated in electrical engineering from the Warsaw Polytechnic Institute in Poland in 1936.

Prior to his transfer to the Altec Lansing plant in Anaheim, Johnson was midwestern sales manager of the company with headquarters in Chicago. A graduate in electrical engineering from University of Wisconsin in 1928, he worked as chief of communication engineering for Webster Electric Co. and was sound systems design consultant on special assignment with International Harvester.

Among those attending the Superior Cable Sales Conference, reading clockwise left to right: Z. GRISSINGER; TOM LYONS; JIM GLENN; N. C. COX; FRED LITTLE; HOMER BELLE; VERNON GUESS; JULES MACK; RONNIE WESTWOOD; JAC JOHNSON; MARVIN CHENNAULT; D. W. HOFFMAN, sales manager, Control Cables Division; J. H. BOWMAN, vice president-sales.

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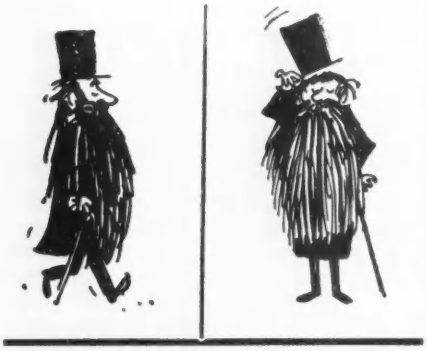

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Stromberg-Carlson Introduces "Petite" Extension Phone

A COMPACT new extension telephone is now in production at the Stromberg-Carlson Division of General Dynamics Corp., Rochester, N. Y., and will be available to the Independent telephone industry from all branch warehouses on July 15.

The new instrument, called the "Petite," is modern in design, and is available in five decorator colors

Stromberg-Carlson's new "Petite" phone is compact, lightweight, and modern in design. It is available in five decorator colors, white, beige, pink, blue, and turquoise, to harmonize with any interior decor.

— white, beige, pink, blue, and turquoise — according to John H. Voss, vice president and general manager of Stromberg-Carlson's Telecommunication Division.

The "Petite" phone offers many advantages to the operating company and to the subscriber, Voss points out. Using standard components which have been use-tested for years, many of its parts are interchangeable with other current model telephones. Transmission is high gain, 500-type, and the lightweight handset is identical with other current models.

The "Petite" has a compact illuminated dial, with the numbers and letters inside the fingerwheel. The dial light glows softly when the handset is in the on-hook position, and then lights up brightly, for ease of dialing in the dark, when the handset is lifted from the cradle. A switch in the base of the instrument allows the subscriber to turn the light off if he wishes. Illumination is provided by a standard screw-type 6-volt flashlight bulb designed to last 1000 hours. Replacement of the bulb can be done by the subscriber through a slotted screw opening in the base.

According to Voss, the "Petite" is essentially an extension instrument, with no built-in ringer. If desired, a new separate wall-mounted ringer for super-imposed, harmonic or straight-line ringing is available. This small baseboard-mounted ringer has an external two-position switch for loud or soft tone.

Where the "Petite" is used as an extension telephone a standard terminal block is employed, with a plug-in step-down transformer for the dial light. Where the instrument is used as a main station the new ringer box serves as the junction box for line termination and a 6-volt A.C. connection.

The entire base of the "Petite" is covered with a non-skid rubber waffle mat. Bright parts of the instrument are brushed aluminum or chrome.

Voss said that exhaustive market research, supported by consumer market testing, indicates a high degree of subscriber demand for this new type telephone.

R. E. Overby Joins Automatic Electric Sales

ROBERT E. OVERBY has joined Automatic Electric Sales Corp. as a staff engineer in the company's carrier and radio sales organization.

Overby will provide technical advice and consulting service to telephone, railroad and pipeline companies on the application of carrier and microwave radio. Headquartered in the corporation's western district office in Burlingame, Calif., he is responsible for serving the states of Ariz., Calif., Idaho, Nev., Ore., Utah, Wash, Wyo., and parts of Mont. His appointment is part of an over-all expansion program to provide better carrier and radio engineering service.

Prior to joining the corporation, Overby served as a carrier and toll equipment technician for Illinois Bell Telephone Co.

Raytheon Names Buck To Advertising Post

WILLIAM H. BUCK has joined Raytheon Co. as advertising and sales promotion manager for the Commercial Apparatus & Systems Division, it was announced recently by Fred O'Kelley, division marketing manager.

Buck, who had held a similar post for the Electronics & Instrumentation Division of Baldwin-Lima-Hamilton Co., will coordinate advertising and sales promotion programs for Raytheon's industrial equipment, magnetic components and power supplies, Radarange microwave ovens, and marine products for commercial craft and pleasure boats. His office will be located at the new division headquarters in Norwood, Mass.

From 1954 until 1958 Buck had been an advertising supervisor in Raytheon's Commercial Equipment Division. Prior to that he had been a technical editor for Boonton Radio Corp., Boonton, N. J., and an advertising assistant with Westinghouse.

Lenkurt Names Krengel Commercial Marketing Mgr.

HERBERT K. KRENGEL has been appointed commercial marketing manager of Lenkurt Electric Co., Inc., San Carlos, Calif., a subsidiary of General Telephone & Electronics Corp.

In his new position, Krengel will direct the activities of the commercial products area sales managers, supporting engineering and service departments, sales promotion and advertising, and the Engineer, Furnish and Install (EF&I) project group.

Krengel has been with the telecommunications firm since 1950, when he was appointed as an applications engineer. Since then he has held positions as manager of systems development, sales engineering departments and the EF&I group, and has most recently served as assistant marketing manager, commercial products division.

Prior to joining Lenkurt, Krengel spent five years with Western Electric's Installation Division and had served during World War II as an army radar technician.

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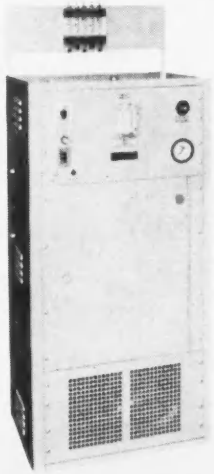

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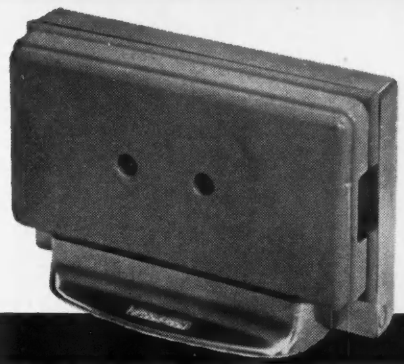

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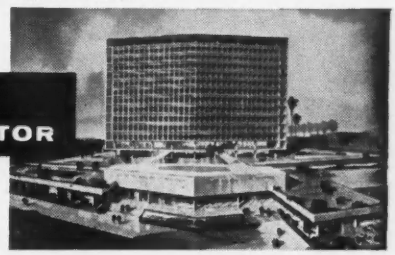
. . . outmodes all other methods of telephone installation

Model No. 104 — shown with standard telephone equipment — accommodates up to 8 No. 44-A Western Electric connecting blocks (4 on each side). Model No. 102 takes up to 6 (3 on each side), or if desired, the back of the Floor-Con can be used for external ringers, buzzers, or auxiliary equipment This allows the desks and furniture to be free from all telephone equipment.



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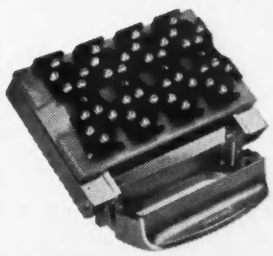

The fabulous FLOOR-CON allows phones to be connected entirely independent of office furnishings. Furniture may be moved or replaced without incurring expensive telephone changes. Gone are the clutter of equipment from desks and walls, and the needless marring of furniture.

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TELEPHONE MARKET PLACE

(Continued from page 99)

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A DIVISION OF GENERAL DYNAMICS

News and views of Independent telephone people VOLUME 9, NO. 3 • JUNE, 1960

Old phone, nuclear unit, indicate progress from the Gay Nineties to the Atomic Age

Retired at 65 and moved to California!

That's the life story of a Stromberg-Carlson telephone with what may be a record for years in service. According to Mrs. V. H. Howard of Buena Park, California, she has a phone that was placed in service by her parents in 1895 when they set up housekeeping in Wyaconda, Missouri.

The instrument remained in service as the regular house phone, connected to the switchboard, until 1959, when the home was sold. At that time, Mrs. Howard obtained the phone and now has it in Buena Park.

Mrs. Howard worked as a switchboard operator when she lived in Wyaconda. The town is at the northeast tip of Missouri near the Iowa state line.

The Stromberg-Carlson instrument was the first phone in Wyaconda, according to Mrs. Howard. Up until the time the phone was retired from service, it was in good working order. In fact, a few months prior to that time, a call was placed over the instrument to Mrs. Howard in California.

Mrs. Howard and her husband have refinished the telephone, but report that the "insides" are the original mechanisms. The phone is retired now, but looks good for another 65 years, *if* they could find a magneto office to make connections.

Starting in where the phone left off — in the Atomic Age — is a new nuclear control system built by Stromberg-Carlson for the Enrico Fermi power plant at Newport, Michigan, just south of Detroit. The plant, expected to be completed later this year, will generate 150,000 kilowatts of electric power for public use.

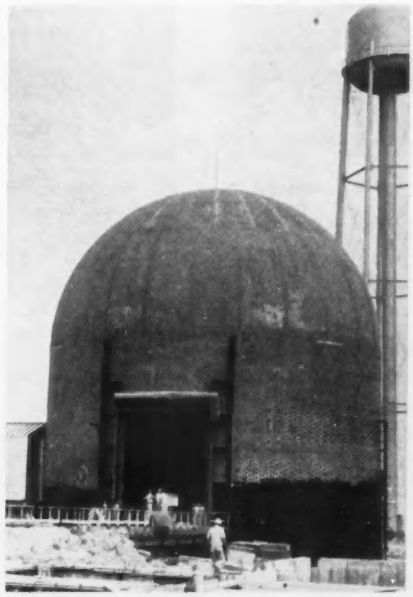
This reactor control is the first completely transistorized nuclear instrumentation and control system built in this country.

Fourteen power companies are cooperating in building the Enrico Fermi plant. Supplying telephone service to the atomic powerhouse is the Newport (Mich.) Telephone Company. Mr. Norman Smith is the manager.

Communications were so vital to the project that the Commission reviewed the case to see if the Newport Telephone Company could handle the job. An affirmative answer wasn't long in coming.

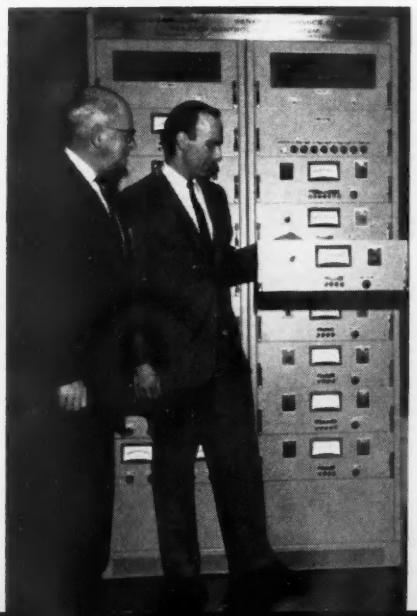
Newport Tel quickly converted to XY® Dial and has furnished complete telephone service since the project began.

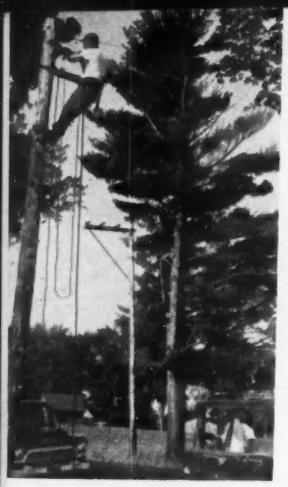
An old and faithful servant. This Stromberg-Carlson phone was installed before the turn of the century; continued in service as a regular house phone until last year. It is the property of Mrs. V. H. Howard of Buena Park, California.



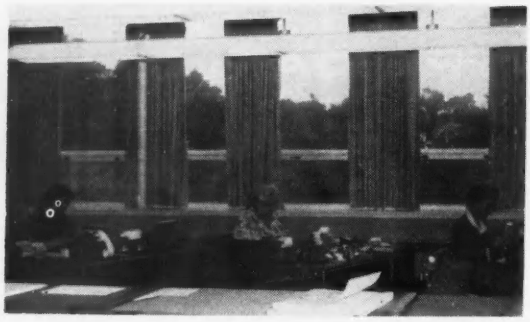
The Enrico Fermi atomic power plant at Newport, Michigan, will be completed later this year. Top service from the Newport Telephone Company helps keep work right on schedule. This "fast neutron breeder" reactor produces more atomic fuel than it consumes; when in full operation will generate 150,000 kilowatts.

Stromberg-Carlson senior vice-president Gordon G. Hoit (left), and project engineer Chester Clarridge check the transistorized nuclear instrumentation and control system before shipment to Enrico Fermi power plant.

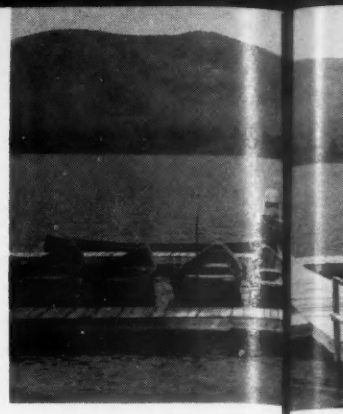




Floyd Larby of Unity Telephone Co. strings line for new camp on Unity Pond.



Thelma Mahar, Ruby Merrill, Gladys Hudario sort toll tickets in business office of Poland Telephone Co. at Raymond.



New England calls

"Don't unpack too much, Mrs. F.; we're off again soon."

"Just keep feeding the washer while I iron . . . . remember, you didn't allow any time for laundry on this next swing."

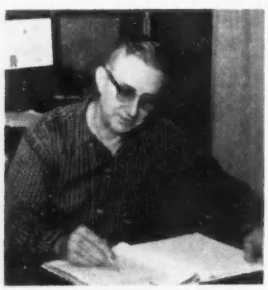
Last summer's vacation trip was planned in two parts. The Southern leg, chronicled during these last months, when most tourists would think of going south, was complete. Now, after a few days to catch up at the office and at home, we were hitting the road again — this time for New England and the adjacent section of New York.

I had grown up within a bicycle ride of Granby, Massachusetts; at that time, if I ever had gone through, there seemed no reason to stop. But now there were compelling reasons, for this town is the last stronghold of Independent Telephony in the entire state — a position jealously maintained by top grade dial service and adequate EAS trunking to nearby cities. This small town, right on the edge of two large cities, is often the "tail that wags the dog" since manager Alston Mugnier began to modernize the telephone service.

Until a few years ago Granby was rural, semi-isolated, and liked it that way. But Holyoke and Springfield pushed out toward it; an Air Force Base forms one boundary line; faculty members from three well-known colleges find Granby convenient and suitable. The normal growth in this town may assume landslide proportions any day.

Mr. Mugnier has a most interesting background. He is a professional engineer, responsible for some of the most vital flood control and water supply projects in central New England. Fish are his hobby — from the

John Connor, manager, and Don Ham (right), installer-repairman, check in the XY Dial equipment for Monmouth exchange with E. A. Smith (center), Stromberg-Carlson installation foreman.

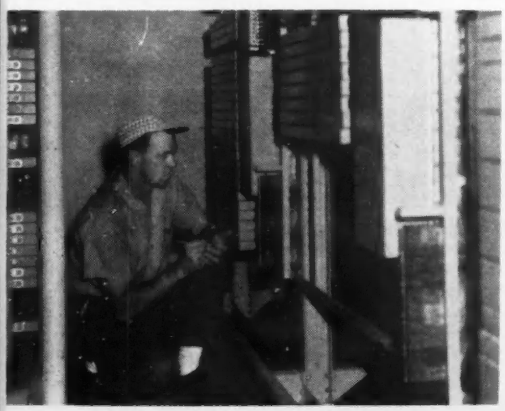


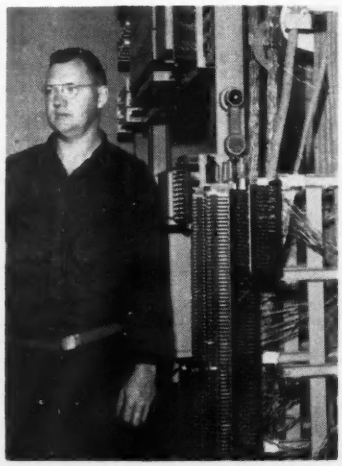
Alston Mugnier, manager at Granby, Mass.

C. W. Ricker, manager at Raymond, Maine.

Loren P. Rand, manager at Manchester, N. H.

Arthur Clark, maintenance superintendent for Lewiston, Greene and Monmouth Telephone Co., in Winthrop XY Dial office.





Aubrey Coffin, plant superintendent of the Poland Tel. Co., had training in C. O. maintenance at XY School.

One of 31 summer camps in Poland Tel. area. These generate lots of toll; unfortunately most is "collect."

ls s easy to answer

Renau Constantinau is part-time C.O.M. man at Granby, Mass. — last stronghold of Independent operation in state.

102 candles on birthday cake for Sam Shepard of Bar Mills, Maine. Harold Carroll, manager, stands at left in group of Saco River Tel. Co. fellow-employees.

conservation angle — and he has written several articles on the habitats and habits of the same fish most telephone men delight in catching!

New Hampshire has an even dozen Independent telephone companies; among the strongest is the Chester Telephone Company with headquarters at *Manchester* and exchanges about equi-distant in opposite directions. *Chester* was converted to XY® Dial with the first R.E.A. loan in the Granite State. This was soon followed by *Weare*, and very soon *Hillsboro* Upper and Lower Village will be converted.

There's real history at Chester. About the same time Alexander Bell was first experimenting, a Chester watchmaker named Marsten succeeded in coupling the "skin-and-string" calling device he and his neighbor used to the telegraph line to make a *talking telegraph*. Unfortunately Mr. Marsten had neither money nor patents; it remained for Mr. L. P. Rand's father to bring Bell-type telephone service to Chester, and organize the first company in the state. Under Loren Rand this small beginning has become a man-sized operation.

It was *living* history at Bar Mills, Maine, where — all unprepared — we walked in on the birthday celebration of the oldest active telephone man *anywhere*: "Uncle Sam" Shepard. There were 102 candles on his cake! This company, the Saco River Telephone Company, was founded 71 years ago by Mr. Shepard. Some time ago he turned active management over to Mr. Harold Carroll, and Maine's oldest telephone system is now one of the most modern.

The two exchanges serve five towns and about 1200 subscribers. As new industry takes up the slack occasioned by the flight of textiles to the South, the potential for which these exchanges were laid out will be realized.

One of the regions which gave Maine the name "Vacationland" is that served by the Poland Telephone Company. Headquarters are at *Raymond*, on Sebago Lake; another office is at *Naples* on Long Lake; others at *Casco* and *Poland* where the storied Poland Spring House includes the names of visiting royalty and most of *Who's Who in America* on its guest register. The Ricker family, who operated the hotels, built the telephone system so that they could know what guests were to arrive at the nearest rail-head and greet them by name. Mr. C. W. Ricker continues as manager of a telephone company now oriented to give complete service to the area.

While vacation-type business is the biggest single "money crop," the area has some light industry for year-round balance. One landmark is a new television tower — tallest man-made structure on earth, dwarfing the Empire State Building by nearly 300 feet.

The three dial exchanges and the PBX serving the Poland Spring House are kept in tip-top shape by Aubrey Coffin, plant superintendent. Growth here is such that the first 5-year goal was reached in 2½ years — one more reason the company is glad that XY Dial equipment was installed.

There was a special reason to visit one of the 31 summer camps in the Poland Tel. area: our daughter had just finished her job as counselor . . . . now we were three.

When Clarence Toll came to manage the Oxford County Telephone Company in 1933, there were about 400 stations, all magneto. Now the number of subscribers is up over 300 percent, and all enjoy dial service.

Wanda Lyman checks some invoices of Chester Telephone Co. . . . Angeline Forbes asks Kenton Quint of Somerset Tel. about recreation in his territory. . . . Joan Pope, bookkeeper, Alice Anderson, treasurer, of the Oxford County Telephone Co.

Some of the increase comes from new building — Turner, for instance, is becoming a suburb for Lewiston and Auburn — but many installations are in older homes where no telephone had been requested until recently.

Each of the five towns has some special activity: Bessey's jams and jellies in *Buckfield;* Leavitt Institute in *Turner;* Panely clothes pins in *West Paris;* Mann brush handles in *Canton;* United Feldspar in *Sumner.* Some of these plants use the 6K-1 system as just right for their type of communications.

Mr. Todd is justifiably proud for having done his own engineering at an appreciable saving; his 40 years in the business aptly fitted him for this task.

Before our next call there was an evening to remember . . . . select your own lobsters at the pier and eat them on the shore. For the two ladies — both born in Maine — this was returning home!

Group at Somerset Telephone Co., No. Anson. Standing, Messrs. Drake, Hill, Kenton Quint; seated, Miss Dunbar, Miss Savage, Mrs. Quint, Mrs. Abbot. Company operates 12 dial exchanges.

This is half of a church steeple, made of Fiberglas! New factory recently opened for business in Monmouth.

John Connor of *Winthrop* was the first Maine manager to order XY Dial equipment; others quickly followed suit, partly because they respected his judgment. Many years before, in Vermont, John had been approached by the Commission to supervise the rehabilitation of a struggling magneto operation. Taking the position that an investment in dial is the only way to remain in business, he financed through a bank, saw the company through dial conversion, then was invited to Maine to help put another company on its feet. A little later — in 1955 — he came to Winthrop to manage the Lewiston, Greene and Monmouth Telephone Company.

Work or play: there's a variety in this region. Products include woolens, tennis ball covers, boats, church steeples, linoleum, hoods for sports cars . . . . to mention a few. Four large lakes nearly double the residents during the vacation season. About 2000 subscribers are now receiving dial service; growth into the territory from nearby Augusta and Lewiston has been steady; cottage owners are now placing the telephone in the "essential" class, along with electricity.

The town of *Unity* has no illusions of grandeur. Perhaps its citizens are happier in living the good life quietly. In 1902 six people who wanted to talk to each other formed a local telephone exchange; some years later the New England Telephone Company built a toll line from Waterville to Belfast through Unity. Gradually the 6 became 60, then 600 . . . . now some 1,000 farmers and villagers all up and down U.S. 202 are served by the Unity Telephone Company through its three XY Dial exchanges.

Mr. H. M. Brown became president and manager in 1958; now that the principal job of dial conversion is past, he is actively promoting new business, both residential and commercial. Among his customers is the largest chick hatchery in the state (500,000 baby chicks weekly) and a growing number of camps on Unity Pond.

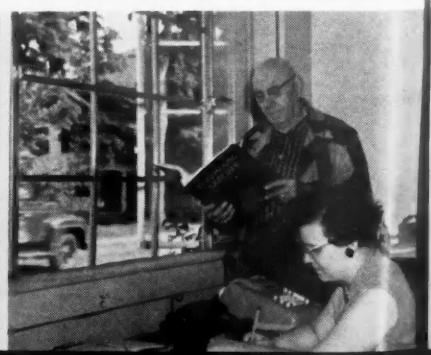
Thirty-one years ago Kenton Quint acquired what was loosely called a telephone exchange — first of an even dozen, mostly bankrupt and lying on the ground. These have been made into one strong, solvent system: the Somerset Telephone Company, operating over a wide area from the Belgrade Lakes to the Rangeleys. *North Anson* is headquarters — centrally located. *Norridgewock* is the largest exchange; *Coburn Gore,* on the Canadian border, is probably one of the smallest anywhere.

Mr. Quint has many long leads in his system, and toll is highly important in the operation. Some time ago he decided to insure adequate transmission by using Stromberg-Carlson repeaters — both hybrid type and negative impedance — with excellent improvement immediately apparent. This "repeatered" area serves Sugar Loaf Mountain — one of the largest ski resorts east of the Rockies.

As we drove toward New Hampshire, the peaks of the Presidential Range made a bold, beckoning outline against the setting sun. As they grew higher, the call became stronger; when the summit stood directly overhead we were ready to stop for the night.

Clarence Todd of Buckfield shows Angeline Forbes how he tests a line in Turner XY Dial Office . . . . Just a small sign to show that this attractive home is also office of the Granby Telephone Company.

. . . Mr. H. M. Brown of Unity dictates an order for additional equipment to Mrs. Barbara Fennimore.



Carrier, repeaters, provide extended rural service, help build a dam, cut costs, in Tenn., Tex., N. J.

Parsons, Tenn.

Stringing long rural lines may be a challenge to some. But progressive telephone men have found that it's easier to let carrier do the job for them.

Mr. T. D. Odle, president of the Parsons Telephone Company of Parsons, Tenn., agrees with this thinking. His company recently installed five channels of Stromberg-Carlson 561 Subscriber Carrier. In studying the situation, Mr. Odle decided that carrier could present a time and money saving when compared with long physical lines strung into rural areas.

At the same time, Mr. Odle selected 541 Negative Impedance Repeaters to boost transmission quality. This combination of repeaters and carrier channels insures improved service for 1200 subscribers. They are served from three exchanges, all XY® Dial, at Parsons, Sardis and Scotts Hill.

T. D. Odle, Parsons Telephone Co. president, can be confident that subscribers will approve of his move to improve service with 561 Subscriber Carrier and 541 Negative Impedance Repeaters.

Greenville, Tex.

Building the dam for a 303-billion-gallon lake requires a lot of helping hands. One of the biggest assists came from Carrier equipment supplied by Stromberg-Carlson and the Quinlan Telephone Company of Greenville, Texas.

Iron Bridge Dam, near Dallas, is slated for completion by the end of this year. The dam is part of a project which will supply 200 million gallons of water daily for municipal, agricultural and industrial uses.

To insure that work moved smoothly on the tightly scheduled project, top telephone service was a necessity. The Quinlan Telephone Company which has five XY Dial exchanges in the area was called upon to supply that service.

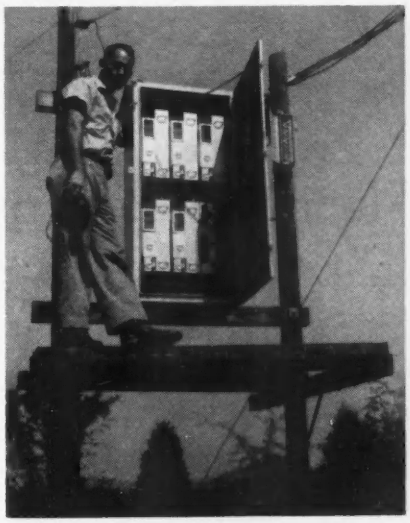
Quinlan Tel owner Dee Cole studied the problem; then he selected 561 Subscriber Carrier to solve it. The carrier units provided the extra lines needed to meet construction company demands.

Mr. Cole knows that when the dam is completed, 561 Subscriber Carrier will still play an important part in his company's plans. The lake, called Tawakoni in honor of a prominent Indian tribe, will attract thousands of summer vacationers. Summer homes, resorts and clubs will require service for part of the year. 561 Subscriber Carrier units are perfect for this application.

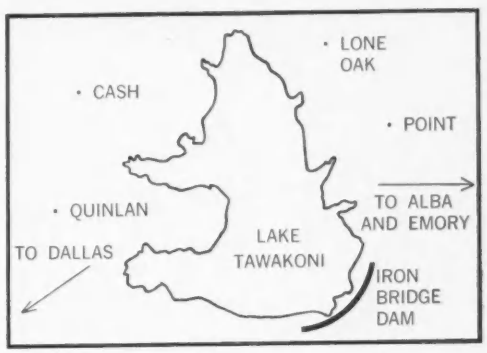
Fort Monmouth, N. J.

Government specifications for the proposed in-out dialing system at Fort Monmouth, N. J. called for a maximum line loss of 4 db. between exchanges. To meet this requirement, the Signal Corps placed an order for 551 Hybrid Type Repeaters.

Larry T. Odle, vice-president of the Parsons Telephone Co., takes a minute from his inspection of the compact 561 Subscriber Carrier equipment. At top are the transmission-boosting 541 Negative Impedance Repeaters.



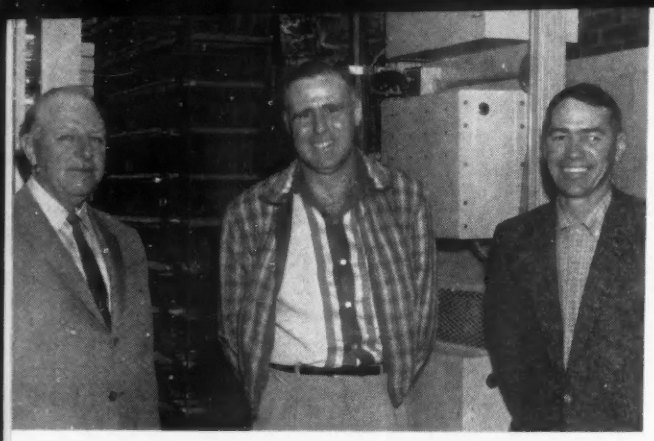
The decision to extend rural service led Larry T. Odle and his father to select 561 Subscriber Carrier.



Quinlan Telephone exchanges surround the Lake Tawakoni — Iron Bridge Dam area near Dallas, Texas.

Stromberg-Carlson engineers carefully studied the schematic drawings which accompanied the order. After discussion with government engineers, they recommended that 541 Negative Impedance Repeaters be used. The 541 Repeaters could provide the necessary gain while saving the Signal Corps considerable space and money.

The recommendation was based on a sound evaluation of repeater performance gained through broad experience in the transmission field. Signal Corps officials gratefully accepted the proposal.



Three men working hard to bring the best in telephone service to the state of Oklahoma: from the left, R. C. Boecher, manager, Pioneer Telephone Co-op; Monte Lee, REA field engineer; Truman Wood, Pioneer assistant manager.

Pioneer Telephone Co-op marks sixth anniversary with accelerated dial program at Kingfisher, Okla.

The dictionary says that the word crescent means "increasing." This seems appropriate because at Crescent, Oklahoma, a leading Independent shows evidence of increasing in size and service.

The Pioneer Telephone Cooperative of Kingfisher, Oklahoma, is in the process of converting its Crescent exchange to XY® Dial. This is one of an even dozen Pioneer exchanges soon to be offering this service.

This stepped-up dial program coincides with the sixth anniversary of the Co-op's first acquisition. In May, 1954, Pioneer Tel. purchased its original four exchanges. It now has 34. Mr. R. C. Boecher was instrumental in organizing the Co-op and has managed the operation since its beginning. Under his leadership, expansion has been constant and considerable.

Kingfisher, the home of Pioneer Tel, is located 36 miles northwest of Oklahoma City. The Co-op serves more than 10,000 subscribers in the north central part of the state. It is the largest Independent having all its exchanges in Oklahoma.

Seven of the 12 Pioneer exchanges to be cut to XY Dial are nearing completion. The other five are entering the final stages of plant construction. When these are completed, 60% of the company's 34 exchanges will be operating with dial service. The company is planning to continue its stepped-up conversion program until the goal of 100% dial is achieved.

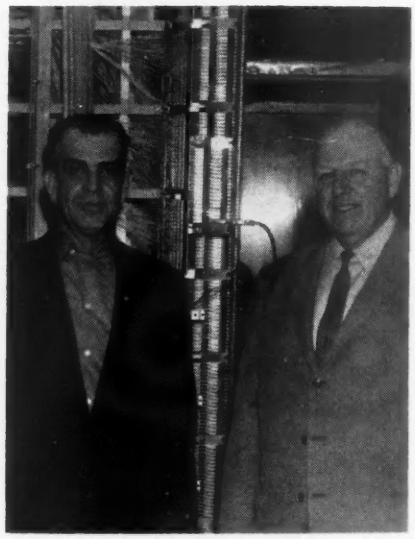
Manager R. C. Boecher has drawn on previous business experience to help him perform an outstanding job at Pioneer Telephone. For the past 21 years he has managed the Cimarron Electric Cooperative. He has also taken an active part in government affairs, serving as a member of the Oklahoma State Senate since 1948.

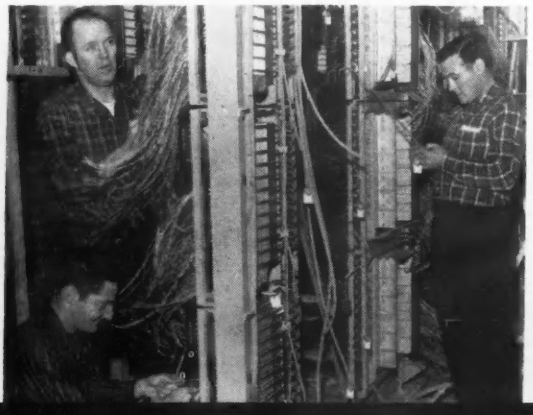
The area served by the Pioneer Telephone Cooperative lies at the southern end of our nation's wheat belt. Cattle raising, both dairy and beef, also supplies an important part of the area income.

Kingfisher is the county seat of Kingfisher County and has a population of 3,400 people. It is ideally located between the state capital, Oklahoma City, and the fourth largest city, Enid. Four colleges are located within 40 miles of Kingfisher at Enid, Edmond, Langston, and Oklahoma City.

This region is growing rapidly as the larger metropolitan areas continue to expand outward. Oklahoma City has registered a 25% increase in population since 1950 and shows no signs of slowing down.

R. C. Boecher (right) looks over the XY Dial layout at the Crescent exchange with Everett Luckett of the J. B. Payne consulting engineer firm. Crescent is one of the 12 Pioneer exchanges now in process of conversion to XY Dial.





Playing a vital role in readying the Crescent, Okla., exchange for cutover are these Stromberg-Carlson installers: Bill Walters, at left, from Tyler, Tex.; Wayne Miller, Jasper, Ala.; Ed Smith, Comanche, Tex.

Transmitter

GEORGE B. FORBES, Editor
J. T. LONG, Associate

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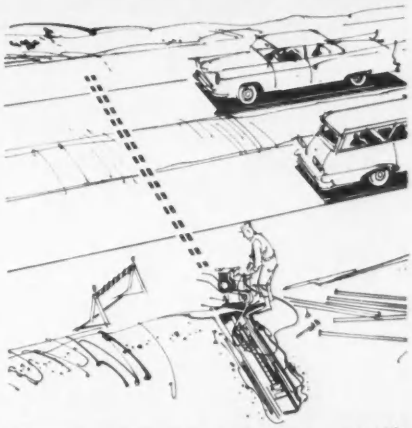

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THE BACK OF THE BOOK

By JOHN G. REYNOLDS

"Strangely Familiar"

COMEDIAN Myron Cohen, appearing recently on the Ed Sullivan Show, attributed this story to Joey Bishop:

As a man was leaving a telephone booth — his call completed — he heard the familiar clink of the dime falling into the coin return slot. As he reached for the coin the phone rang. He picked up the receiver and the operator asked:

"Was your call completed, sir?"

"Yes, indeed," the man replied.

"Then," she enjoined, "would you kindly place the dime back in the telephone?"

"I'm sorry," said the fellow, "I cannot do that, but if you'll let me have your name and address I'll be happy to mail it to you."

For Your Dictionary

IT'S ALL IN the name, according to the Bell System Names Committee, and here are the latest terms added to the telephone vocabulary: Electronic Central Office, replaces electronic switching system; Belltronics refers to services electronic techniques will provide; Automatic Dialer, instead of repertory dialer; Bell Chime, for centralized ringer; and Home Interphone and Farm Interphone.

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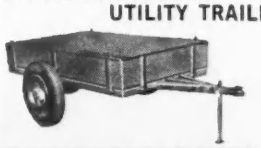

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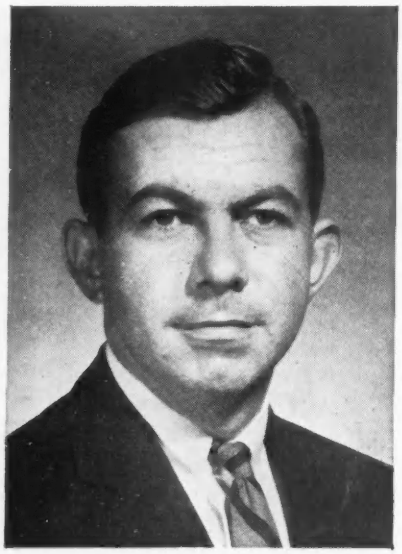

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After serving with the U. S. Army in Korea, Fred joined the General Telephone Directory Company in 1954. He was promoted to Sales Supervisor of the Durham unit in 1957.

Fred is a man who likes to get out and do things. During his college days at the University of Kentucky, he was a member of no less than seven campus organizations—including the Student Government Association. Now married, with three children, he keeps active in community affairs as member of the American Legion, VFW and BPOE.

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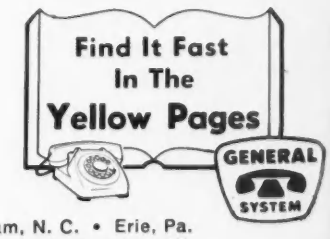

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